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ABSTRACT

The monograph explores development in the infant's first year of life, particularly as it influences later mental health or illness. An introductory section presents a schematic history of early clinical practice (including some earlier preventive trends, changes in the way we think about childhood, and changes in the role of government in ensuring the well being of children) and cites some general research considerations (such as current trends in psychological research, applications and limitations of research in infancy, and the interactional nature of mental health). A second section presents research findings for the following areas: general predispositions and individual differences of the infant's contribution to mental health, effective environments for mental health, the infant-caregiver interaction, and the development of the infant's attachment to a caregiver. Risks for development and clinical interventions are highlighted in a third section. Among conclusions in a final summary are five factors involved in individual vulnerability versus invulnerability in mental health--multiplicity of stresses; alterations of adverse environments after the early childhood period; temperamental, sex, and genetic differences; intrafamilial relations; and the wider social environment. A list of approximately 300 references concludes the monograph. (SBH)

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development of mental health in infancy

NIMH Science Monographs 3

Mary Blehar, Ph.D.

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FOREWORD

In 1978 the report of the President's Commission on Mental Health emphasized the strong influence of the early childhood period on later mental health or illness. The report called for more applied research and services in this area. Further, a growing awareness from research findings of the influence of environmental factors on the neurophysiologic systems, particularly, it appears, during certain key periods of development, has also called research attention to these early years. Finally, although later periods of life may continue the process of maturation, this earliest developmental period remains a crucial formative phase with long-lasting consequences for each individual. Our knowledge base has been expanding at a healthy rate. It is a timely moment to assess our current understanding. This *NIMH Science Monograph* explores development in the first year of life.

The newborn infant presents both a challenge and useful corrective to many received categories of our thinking. At the same time the infant is powerfully programmed yet marvelously and subtly reactive to environmental influence, ever a source of wonder. Still lacking a language, capacity for reflection, or differentiated reactions, it is in some degree a holistic bundle, perceiving through new sense organs novel experience not yet conceptually formulable and reacting to it polymorphously. Hence, research in infancy is a holistic field, combining knowledge from biological, psychological, and social disciplines. These in turn must treat the conventional distinctions between physical and mental, cognitive and affective, with some care.

The field of infant mental health has two important objectives. The first is to prevent deviant development and promote normal development during the early years, to help alleviate some of the more serious childhood problems precipitated by learning disabilities, child abuse or neglect, and psychological or social deprivation. The second objective is to trace the long-term effects of early childhood experience on the precipitation of mental disorders later in life. This volume is offered as a contribution towards the realization of these ends.

Herbert Pardes, M.D.
Director
National Institute of Mental Health

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This monograph is intended as a synthesis of knowledge to provide professionals and the interested general reader with a review of current and classical literature on social and emotional development in infancy.

Judgments and opinions expressed in this volume do not necessarily represent the views of the National Institute of Mental Health or the U.S. Department of Health and Human Services.

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Development of Mental Health in Infancy

Mary Blehar, Ph.D.

INTRODUCTION

In 1970, the Joint Commission on the Mental Health of Children wrote that the American public in the 1970s faced the challenge of caring not only for mentally disturbed children but also for those at high risk for the development of emotional disorders. Surveying the scope of the problem, the Commission defined its magnitude but could offer no ready solutions because none were to be had.

More recently, in 1978, the President's Commission on Mental Health again reiterated the importance of childhood as a critical period for the development of mental health. The report made a distinction between primary and secondary prevention of childhood disorders, the former relating to populations in danger of pathological development and the latter to individual children already exhibiting early signs of disturbance that, left unchecked, could proceed into severe adult pathology. The report called for more applied research and services activities in these areas.

A call to ensure the mental health of children in the first years of life, especially in the very first year, is closely related to one to ensure full physical health and cognitive growth, since at no time in development is the distinction between mind and body (always difficult to make in practice) less easily discernible. The infant's knowledge is a motoric, physical one. In the first year, reflection and separation of thought from action are not yet firmly established psychological phenomena.

Most broadly defined, the subject of this monograph, "infant mental health" would be a holistic field encompassing virtually all aspects of early development. In truth, a much more circumscribed use of the term is to be found herein. "Infant mental health" is defined chiefly as a field in which research findings, for the most part concerned with social and emotional develop-

ment, are applied to problems of primary and secondary prevention of emotional disturbances and the promotion of mental health. The term "mental" is used not to compartmentalize infant modes of functioning prematurely into dubious categories but only to provide some continuity between concerns addressed here and ones traditionally considered in the domain of clinical psychiatry.

To keep within limits of space and content, the manuscript treats the infant as consisting of two separate aspects, affect and cognition, it being acknowledged all the while that the two interact. Research into infant learning and perception has been referred to briefly and incompletely, despite the fact that the fullest understanding of mental health would have been enriched by the inclusion of such topics. Because even the narrower areas of social and emotional development in infancy are so broad and well researched, a decision has been made to focus primarily on social relationships in the first year as they are thought to support or to thwart psychological health. The nature of the evolving relationship between infant and caregiver is viewed as a fundamental determinant of mental health. It is acknowledged that this selection reflects the personal bias of the author. Research discussed in the monograph is meant only to illustrate selected issues rather than to cover fully or evenly all the excellent work being done today. The reader is asked to bear these caveats in mind.

The National Institute of Mental Health has been working to promote a better understanding of infant development and mental health. In the pages that follow, we shall be exploring some issues which have implications for mental health as well as some findings that are enlarging our understanding of the processes of development.

A Schematic History of Early Clinical Practice

Two related trends can be observed in the history of clinical practice, the first an evolution of practice from treatment to prevention, and the second a chronological decrease in the age at which intervention is considered most helpful. Sigmund Freud, perhaps psychiatry's greatest revolutionary, used the talking cure, a method of retrospective inquiry, to treat neurosis in his adult patients. As the patient was encouraged to associate freely about early life events, Freud would inevitably discover some occurence of a traumatic nature responsible for current problems. An artist as well as a scientist, Freud was an astute observer of the human condition and, because of his insightful

reconstructions of infancy and early childhood, many consider him to be a major influence in the psychology of normal as well as abnormal development.

Freud at first assumed that his patients' recollections of their early experiences were accurate reports, but later he became convinced that they were fantasies and wishes. However distorted, they were central in mental life. Freud came to appreciate the role of strong defenses against the recall of early childhood experiences in the etiology of symptom formation. His early mistake in accepting patients' accounts at face value proved to yield a worthwhile lesson—it compelled caution against literal belief in retrospective accounts, despite the best rational intentions of the informant, and at the same time it established the importance of the early years in the genesis of adult mental illness.

Even to Freud, infancy was inaccessible to a retrospective method which relied upon verbal expression of word-encoded memories. Because he could not delve deeply into infancy, it is perhaps understandable that he emphasized the importance of the later-occurring Oedipal Complex in the dynamics of normal and abnormal personality. Throughout much of his career, Freud stressed the critical nature of the opposite-sex parent-child relationship, and it is for this insight that he is probably best known. However, toward the end of his clinical career, he developed an interest in the earliest developmental events, particularly the first relationship between infant and mother. In *Inhibitions, Symptoms, and Anxieties* (1956), he established a hierarchy of anxieties, with the child's love of the mother and anxiety over her accessibility at its core. In *An Outline of Psychoanalysis* (1940), he stated that a child's mother was ". . . unique, without parallel, established unalterably for a whole lifetime as the first and strongest love object and as the prototype of all later relations—for both sexes." For the most part, however, these theoretical contributions tended to be minimized by his disciples.

Freud's theories of personality development referred to inner states and to early emotional experiences discerned through later verbal retrospection. Similarly, most post-Freudians, disciples and dissidents alike, regarded retrospective, verbal procedures as the essential means of access to the psyche. Such methods presented an often insurmountable challenge to the new field of experimental psychology, which aimed to subject theories and therapies to empirical testing.

In its early years, clinical practice tended to stand apart from the mainstream of experimental behavioral science. Psychiatry

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was anchored in attempts to understand personality through methods unacceptable to experimentalists, who were trying to define functions, chiefly normal, in terms of broad, objective, testable rules. Clinicians acknowledged fully the importance of the early years for understanding mental illness, but their theories were limited by a paucity of first-hand scientific information. Partly, as a corollary, clinical psychiatry tended to focus on finding remedies for problems of disturbed adults rather than on preventing disorders in infancy.

The 1950s and 1960s witnessed further breakthroughs in the treatment of mental illness. In 1961, the Joint Commission on Mental Illness and Health, in *Action for Mental Health*, reported on the success of the tranquilizing drugs in ameliorating the condition of severely disturbed mental patients. The drug therapies not only appeared to provide relief from psychotic symptoms but often set the stage for successful verbal therapies. New talking therapies were developed, variations on one-to-one, such as group, couple, and family therapy. These techniques and enhanced understanding of the biochemistry of psychiatric disorders promised benefits to those suffering from mental illness. Nonetheless, clinical emphasis was decidedly curative rather than preventive.

Some earlier preventive trends. While out of the mainstream of clinical practice, an orientation to prevention was to be found as early as the second decade of the present century. Clifford Beers, author of *A Mind that Found Itself* (1917), was a former patient in mental institutions. An articulate writer and bold thinker, Beers became convinced of the importance of preventing mental breakdown when it was thought to begin in childhood. Working through the National Committee for Mental Hygiene, and inspired by examples of control in epidemic disease by means of sanitation and immunization, he and other members set out to educate the public concerning child guidance, birth control, eugenics, and early treatment of emotional disturbances. But their ideas of prevention and intervention tended to be based on goodheartedness and fashion rather than on data about what was optimal for children. The Movement remained apart from prevalent clinical practice because of its drift away from the severely mentally ill and disadvantaged to the young, less ill, and advantaged populations.

Much of the spirit of today's movement toward prevention and early remedy-finding was captured in the Report of the Joint Commission of the Mental Health of Children, *Crisis in Child Mental Health: Challenge for the 1970s* (1970). This doc-

ument was an impassioned plea for better care of children at risk, particularly those severely disadvantaged by the social ills of racism and poverty. The authors drew up a bill of "rights," among them the right to be wanted, to be born healthy, to live in a healthy environment, to have basic needs satisfied, to experience continuous loving care, to acquire requisite cognitive skills needed for life in our society, and to receive care from facilities that kept children closely tied to their permanent social settings.

It is well nigh impossible to determine how much the strong current clinical orientation toward infancy stems from mandates such as these versus a more general emphasis on prevention, by which infancy and childhood are naturally targeted. As is usually the case, the spirit of an era moves and shapes thinker, clinician, and scientist alike.

A broadening of horizons. The field of infant mental health has been influenced by several trends—such as historical changes in the way childhood is conceived, the Federal role in providing for children, advances in experimental psychology (especially developmental psychology), and the growth of a network of scientific communication by which practitioners of related disciplines can share their insights into human growth. Let us look briefly at each of these.

Changes in the way we think about childhood. Historians of childhood have challenged the fixity of our current conceptions by providing portraits, based on available records, of what it was like to be a child in past epochs. Aries (1962) suggested in *Centuries of Childhood* that in the middle ages there was no clearcut concept of childhood, no special morality for children, no special training. Children were expected to be integrated fully into adult life by age 7 or 8 inasmuch as they were working alongside their parents and dressed as adults—in sharp contrast to modern practices with children. DeMausse (1974), a psychohistorian, attempted to show that attitudes toward children have generally become more humane and less ambivalent over the centuries. Stressed in both analyses and underlying their putative trends are the lowered infant mortality rates to be found today, which have allowed parents to take the physical well-being of their offspring more or less for granted and to make a deep emotional commitment earlier to each child. Such a commitment was psychologically uneconomical when perhaps as many as two out of three children died before their second birthday. In their book, *Infancy*, Kagan, Kearsley, and Zelazo (1978) have delineated what they see to be an evolution in con-

ceptions of the parent-child relationship with increased emphasis on the importance of the affectionate quality of that tie so that today psychological nurture of a child (as opposed to earlier emphasis on physical nurture) has come to be widely regarded as the *sine qua non* of good parenting.

Along with the growing separateness of childhood have come other changes. The juvenile period of dependency has been lengthened by demands of a highly complex, postindustrial society, so that the young, in preparation for adult life, now commonly undergo an apprenticeship, as it were, that can start before age 3 when a toddler enters nursery school and end after age 25 or 30 when a youth finally receives an advanced degree. Attendance in these educational institutions requires isolation from the ongoing world of adult everyday work so that children are more and more to be found in homogenous, age-segregated groups.

Stage theorists of cognitive development, such as the renowned Piaget, have increased current awareness of qualitative differences between the intellectual functioning of children of various ages and of adults. Piaget's theory (1952, 1954) sees children as proceeding through orderly stages of cognitive development in an invariant sequence from infancy to adolescence. At each stage, they can assimilate information from the environment only in accordance with the intellectual structures or schemas that they possess and which in turn are created and modified only gradually through interaction with the world. Hence, the infant of 6 months, the child of 6, and the youth of 16 construe the same physical object differently depending on how they have interacted with it or similar objects in the past and on what classificatory structures they can insert it into. In essence, Piagetians view children not only as lacking the mental fluidity which allows for rapid adult thought but also as possessing mental structures which are so qualitatively distinct from adult ones that the physical world is construed differently. Not until adolescence has maturation occurred and sufficient experience been accumulated so that adult structures of thought are attained. Although Piaget is primarily a cognitivist, he has noted that structures of emotion depend on cognitive structures and hence go through orderly changes during development.

Which period of childhood is most critical for mental health? While 20th-century thinkers have generally agreed that childhood holds a special significance for the formation of personal and intellectural traits, they have not always agreed upon the particular period most crucial for development. Around the

turn of the century, G. Stanley Hall, a genetic psychologist, applied the tenet that ontogeny recapitulates phylogeny to childhood (1904). According to this view, during early childhood preordained species tendencies unfolded, and attempts to tamper with their evolutionary progression were to be avoided. Adolescence, on the other hand, was viewed as a period of maximal plasticity and educability, for it was then, it was thought, that children had finally reached a level which enabled them to attain the highest forms of human culture.

The ascendency of early childhood as the period most important in development has occurred slowly in the popular and scientific mind. Kagan et al. (1978) have noted some of the research literature that underlies this belief, and indeed serves as its contemporary bedrock, such as studies of the deleterious effects of maternal deprivation in infancy on later personality and cognition, of imprinting and social attachments, and of neural development and maximum neural plasticity early in the life of the organism. But they assert that "the degree of conviction with which the more general belief (the primacy of early experience) was held often exceeded the trustworthiness of the available information" (p. 134). Indeed, the issues of the reversibility of the effects of early experience and of continuity between infant functioning and later functioning—as yet unresolved—are of great importance for mental health.

While the majority of works cited herein will highlight infancy as an important period in human development, it is nonetheless well to bear in mind the fact that contemporary views of childhood are shaped both by the behavioral and physical demands and characteristics of children and, to some extent at least, by cultural demands and beliefs.

Changes in the role of government in ensuring the well-being of children. Perhaps as an indirect function of the growth of the egalitarian ideal in our society has come the belief that every child has the right to develop to his or her fullest potential, physically, emotionally, and intellectually. The means for achieving such an admirable end, however, have shifted somewhat from the individual family unit to schools and to government. In the past, only when parents failed to provide adequate nurture were outsiders considered within their right to intervene on behalf of the child. More recently, the popular conception of proper governmental roles in private life has expanded and liberalized, so that Federal intervention on behalf of even advantaged children, by direct or indirect means, is no longer looked upon with dismay by many (Kahn et al., 1979).

A well-known attempt to intervene on behalf of children at intellectual risk is Head Start, a federally sponsored preschool program of cognitive enrichment started in the early 1960s and meant to assist environmentally deprived children to achieve their full cognitive potential. (For a review, see Bronfenbrenner, 1974b.) Head Start and other cognitively oriented programs further served to stimulate new ideas about intervention for infants and children emotionally at risk. Among the most important ones are (1) that intervention must begin early and must be ongoing if it is to be successful in the long term; (2) that prevention is easier to effect than remediation because early experience has an enduring impact and one difficult to reverse; and (3) that the child alone is not the appropriate target for intervention but rather that both parent(s) and children must be enlisted. Parents are continuous, long-term influences on their children, and without their cooperation efforts to improve the child's situation have a greatly diminished chance of success.

The cognitively oriented programs concerned with intellectual development have also stimulated thought about measurement techniques. It was relatively simple to find instruments for the measurement of intellectual gains from cognitive programs (although some question the validity of the instruments in assessing functioning of the children properly), but it was much more difficult to find sensitive and reliable means of assessing program impact on emotional and social development. Researchers who sought to undertake interventions on behalf of children at risk became more sophisticated about the kinds of questions they were asking, the goals they hoped to achieve through their programmatic efforts, and the methods they used to measure progress.

Some General Research Considerations

Current trends in psychological research. In its own infancy, experimental psychology was concerned chiefly with sensory functioning of normal adults. Trying to imitate the more rigorous science of physics, it defined as a proper subject of inquiry external, observable behavior rather than inner states or motives; and, in order to study the former, subjects, under carefully controlled laboratory conditions, were measured as they reacted to perfectly calibrated manipulations. There was little room in experimentalists' minds for the inexact

and intuitive approach of the clinician. It was not that the former were indifferent to the complexities of naturally occurring behaviors or moods, but that they despaired of ever being able to achieve sufficient control over all factors influencing them so as to be able to make accurate scientific predictions. The result of this state of affairs was a rather uneasy coexistence between clinicians and researchers. Clinicians viewed their laboratory counterparts as narrow-minded, and experimentalists viewed clinicians as armchair theorists of behavior.

A more optimistic situation is evolving today. Advances in research methods and in a broader definition of problems seen as within the purview of experimental science have made a genuine rapproachement between the two disciplines possible. Clinicians are making use of findings from experimental psychology to supplement and correct their theories and to guide their interventions. Researchers in turn are studying behavior and mental structures that have potential practical significance. For example, inner structures of the mind, which lay persons think of as guiding behavior and giving it a voluntary quality, are no longer considered taboo in "hard-nosed" research. Using computer simulation, psychologists have been able to model systems with complex structures that process input from the environment and adjust responses in accordance with constantly monitored feedback. Ethologists and others with a sociobiological orientation are studying naturally occurring behavior outside of the confines of the laboratory. Those with an ecological orientation are considering the influence of social and environmental structures on the behavior of the individual.

Technology has aided this wedding of interests by making it possible for scientists of diverse disciplines to communicate rapidly across distances. Today, a holistic picture of infant behavior is being pieced together by researchers in such fields as anthropology, behavior genetics, ethology, animal psychology, medical science, and developmental psychology. Such a picture promises to be far more complete than any gathered separately by the individual disciplines.

For example, anthropologists bring to the field of infant mental health a skepticism of claims that there are only a few paths to human fulfillment. Clinicians and researchers alike are recognizing that their notions of human normality may be biased because of their own cultural backgrounds. At the same time, they are trying to seek those elements in personality that may be universal characteristics of mentally healthy individuals.

Behavior geneticists come from a rich heritage of biological science in which the biological contribution to the expression of

traits has long been studied. They bring to infant mental health an appreciation of the possibility that behaviors, as well as physical structures, may have roots deep in the genetic code of the individual or the species. Mental health practitioners can now talk more comfortably about genetic factors in such disorders as schizophrenia, manic-depression, autism, and even in such social ills as alcoholism.

Ethologists share with behavior geneticists a biological orientation. They observe overt behavior in natural settings and stress the need to describe it in terms of reliable, meaningful units. They enrich understanding of behavior by asking what its current function is and what its function has been in the evolution of the species. (For an orientation to the field see Hinde, 1970 and Blurton-Jones, 1972.)

Animal psychologists working in the laboratory and in naturalistic settings have made significant contributions to infant mental health. For example, a series of experiments on the effects of social deprivation in monkeys (Harlow, 1958, 1965; Harlow et al., 1963; Griffin and Harlow, 1966) and on infant-mother separation (Kaufman and Rosenblum, 1967) have served as models for the human case. Other workers (e.g., Levine, 1956, 1959; Denenberg, 1962; Denenberg and Whimbey, 1963) have shown that mild physiological stresses can affect the capacity for emotional expression and for fearfulness both in the adult animal as well as in the offspring of the next generation. Such work, impossible by virtue of ethical constraints to undertake in a deliberate fashion in humans, has nonetheless aided in understanding human infancy.

Medical scientists have been alert to the emotional elements that may be present in seemingly physical diseases, so that today the psychosomatic components of many illnesses are being investigated. In infancy, the pediatrician, neurologist, and neonatologist have combined to provide techniques for assessing the physical status of the newborn, individual differences among infants, and methods for optimizing the development of the infant at high risk. Infant assessment promises to put an end to one-sided notions of the environment as effecting change on a passive, unstructured infant. Since Freud, clinicians have been interested in the possibility that constitutional differences might account in part for differential susceptibility to mental illness, and hence research into early differences among infants is potentially of great applied significance.

Developmental psychologists, in their own endeavors, draw upon the contributions of researchers in all of these fields. Indeed, many scientists in these disciplines consider themselves

developmentalists, primarily or secondarily. Borrowing heavily from these fields, and indeed constituting a hybrid of them, developmental psychology also uses standard techniques of experimental psychology in its attempts to understand the process of change observed throughout the lifespan. Sophisticated methods of data analysis have been made possible by the creation of high-speed computers which can perform computations that only a relatively short time ago would have required years to perform.

Hence, more complex questions can be asked of large amounts of data formerly unmanageable. Naturalistic observation, a major tool of ethologists, has gained great popularity among developmentalists, who also study behavior in more structured situations. The use of videotapes has gained great popularity as an aid in capturing and analyzing sequences of verbal and nonverbal behavior. This use is particularly important in studies of infants because nuances of interaction may be difficult to spot at first glance and might otherwise get overlooked.

Research in infancy: Its applications and limitations. The troubled young child more often than not becomes the troubled adult. While exceptions to this statement occur with a frequency sufficient to make us wonder about the wisdom of sweeping generalizations regarding the importance of infancy or the irreversibility of trends set into train therein, nonetheless early patterns all too often persevere, perhaps both because of their primacy and because adverse environmental conditions persist. We are coming to realize that risk can be imposed on infants by virtue of their physical status at birth or by perinatal factors and that this risk can be magnified or minimized manyfold by later environmental influences. Both constitution and environment can, in extremes, provide sufficient conditions for adverse outcomes, but adverse physical status is found disproportionately in cultures unsupportive of healthy emotional and cognitive development. While we must await the execution of well-designed longitudinal studies to show unequivocal relations between infant and adult circumstances, there exists an appealing mental economy to the notion that a relatively small amount of time spent working with infants and their families will prevent the later need for extensive therapy with a disturbed adolescent or adult. And the problems of contemporary children, among them abuse, neglect, and psychological failure to thrive, stem, at least in part, from inadequate early nurture and deviations from optimal patterns of caregiver-child interaction; these difficulties

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are compelling enough of themselves to merit immediate, diligent attention.

Developmental psychology and the sciences with which it has formed an intellectual alliance have together produced in the past two decades much information on the conditions which support healthy emotional, social, and cognitive development. The success or failure of current efforts to prevent ills in children, and by implication, later mental illness through intervention in infancy, depend in large part on the substance of this knowledge.

The goal of this monograph is to give an understanding, however incomplete, of how far the field of infant mental health has gone toward providing a foundation for prevention. The samples of research described here are full of practical implications. If much of what is written seems tentative and open to qualification, the reader is asked to bear in mind how much understanding has only recently been advanced, as well as how much distance as yet remains to be traversed in a search for the origins of mental health.

The interactional nature of mental health. No definition of mental health will suit all readers. Many individual differences cannot be labeled clearly as desirable or undesirable. While generalities that indicate mental health can be sought (and perhaps these are most evident in infancy), still there are myriad adaptations to specific environments, which, although they might not be effective in promoting coping in one culture, yet can serve that purpose well in another one. Modern Western psychologists and parents alike move in a society that places more or less clearly defined demands on members. One goal foremost in their minds is the preparation of children for life within that society. Today, few children receive extensive training in techniques of hunting and gathering but are educated at early ages in skills requiring a high degree of mastery of book learning. Early autonomy and independence are prized attributes, and intellectual aptitude has replaced physical prowess as a bedrock of successful living. Our view of mental health in infancy is colored by such requirements.

However, the characteristics of infants and some environmental requirements posed by these have a more or less transcendent nature since they can be viewed as applying to all humans. For instance, few question the need of infants for focused caregiving if they are to develop into emotionally enabled adults. There is more latitude in interpretation, however, regarding who the caregivers ought to be, how many are

allowable before they become too many for attachment to occur, and the conditions under which caregiving ought to take place. Hence, an increased understanding of normal development in infancy is a prerequisite of any interpretative, decision-making process engaged in by the individual parent. Yet an understanding of the processes of normal development in all their subtle complexity is no easy matter.

An ongoing interaction between infant and environment constitutes the basic process of development. It is always reciprocal. Infant structures are continually being changed by the environment and in turn also change *it*. Throughout development, structures are created and modified by feedback and in turn feed forward to change the environment. Hence, experience continues to widen and differentiate infant cognitive and affective structures.

Development is so mutual a process between infant and environment that it is difficult to disentangle the relative influences of each upon the other. It is, however, useful to try to parcel out the separate contributions of each aspect for descriptive purposes, and to this end, some dimensions of the infant that can influence what the caregiver does will be considered.

During the first year the infant's world is largely defined and limited by one or a few caregivers. Caregivers not only provide the social stimulation needed for full emotional development but also serve as mediators of the physical environment. Not until near the end of the first year do infants gain the degree of mobility needed to move about independently among objects in the physical world.

Beyond the immediate family, ecological variables impose their mark on the developing child. Bronfenbrenner (1974a) has admonished social scientists to attend to the impact of second-order variables, such as schools, government, and neighborhood structures, on first-order variables, such as caregiver-child interaction. These second-order variables can determine to a great extent the quality of interaction between parent and child.

If we keep in mind the limitations imposed on our viewpoint by our own cultural backgrounds, mental health can still be seen as the outcome of an interactional process between the infant and the environment. The end of infancy does not bring to a close the possibility for achieving mental health. But the first structures attained in infancy, based on specific interactions with the environment, set up certain expectations about one's own competencies and abilities to affect others which may be

more difficult to modify later and which can serve as selective filters of experience. Hence, we examine the infant with interest.

Emotion-cognition relations in infancy: An overview. According to Izard (1978), emotions emerge as they become adaptive in the life of the infant and in infant-caregiver and infant-environment relationships. Emotions, by virtue of their motivating influences, constitute the principal organizing factors in consciousness and in cognitive interpretative processes. Emotions have public aspects (e.g., facial expressions) that provide social signals to caregivers, and they also help set the stage for particular types of learning and development.

In the newborn, emotions play a vital role in survival. The young infant exhibits distress, which compels action of caregivers. As early as the second month, positive emotions, such as smiling, greatly facilitate infant-environment interactions. Interest in the environment grows and expands opportunities for interaction and exploration.

Somewhat later in the first year, emotions help the infant differentiate the self from others. Shyness experienced in interaction with a stranger, and even rudimentary shame (likewise experienced in stranger interaction, when the infant may feel awkward or inept) initially cause a turning away from the source of the emotions and inward upon the self. Eventually anticipation of shame can motivate the development of competence and decrease the likelihood of experiencing shame (Tomkins, 1962, 1963). Anger and disgust can contribute to self-development by increasing a sense of personal control and determination in the face of frustrating and distasteful experiences.

If basic needs are attended to, infants are enabled to turn to the environment. Through its contingency and appropriateness of response, they derive a sense of competence. A body ego gradually develops through the joint effects of maturation and environmental feedback until, by the last quarter of the first year, most infants possess a rudimentary capacity to distinguish themselves from their actions upon things and from others. Interest in the environment and enjoyment of it increase in intensity and are activated by an ever-widening circle of events. Piaget (1952) has noted how infants will act "to make interesting spectacles last." Increased and sustained contact with specific persons is an important aspect of the development of attachments. Charlesworth (1969) has argued that surprise, experienced by infants in violations of their own expectations, plays a significant role in cognitive development. Sroufe and Wunsch (1972) have studied infant smiling and laughter dur-

ing games with the caregiver. Laughter sustains such games and provides infants with positive experiences in relation to new and changing environmental conditions. In middle infancy, the novel activates interest, interest motivates exploration, exploration leads to surprise, surprise interacts with interest to heighten attention and further exploration, familiarity or mastery leads to joy (Izard, 1978). The sight of a familiar person can also lead to the experience of joy.

Whereas previously relationships with caregivers, while increasingly reciprocal and selective, were nonetheless not based on an awareness of the separateness of the self, attainment of object permanence enables infants to imagine caregivers as individual persons and to envision separation. Increased locomotor skills which permit rapid, self-initiated motion combine with cognitive achievements to bring about a full-blown attachment relationship, the hallmark of which is maintenance of proximity.

The apparent dependency on one or a few figures, now readily seen, is not a pathological phenomenon. Attachment is a normal, even essential part of development in infancy, and its presence suggests that the caregiving environment has been sufficiently responsive and affectionate.

A sense that the attachment figure is readily accessible further frees the infant to explore the physical and other social environments. Hence, a growing focused relationship goes hand in hand with increased self-reliance. An absence of attachment or anxious attachment, on the other hand, constitute danger signals that social development is off course.

Fears also emerge during this period and set the stage for important kinds of learning. Fear reminds one of personal vulnerability, physical and psychological, and escape from a fear-rousing source often takes the form of flight to another person. Separation from a caregiver to whom the infant is attached activates fear, as may the appearance and approach of strangers or any number of experiences too widely discrepant from past ones. Fears have an adaptive value in promoting protection of the self. By the end of the first year, the differentiation of the self from others is as yet rudimentary, but infants may exhibit a primitive kind of empathic distress in response to the distress of others (Hoffman, 1978). The work of Radke-Yarrow (1977) suggests that guilt and empathic altruism may occur in the second year of life.

In summary, emotional and cognitive development are inextricably intertwined. Interactions in infancy with caregivers and with the physical environment shape affective-cognitive struc-

tures (Izard, 1978) which, after the development of memory and the capacity for symbolic thought, become predominant aspects of personality. (For more detailed overviews of affective development in infancy, see Sroufe 1977, 1978; Lewis and Rosenblum, 1978.)

The mentally healthy infant cannot be defined in terms of one type of emotional reactivity. Infants possess certain general modes of reacting to the world but also specific ones which are the stuff of individuality. Ideally, caregivers should understand this individuality and take personal tempo into consideration by adjusting their behaviors in accordance with the infant's cues.

RESEARCH FINDINGS

The Infant's Contribution to Mental Health: General Predispositions

In the search for the origins of mental health, a beginning may be made when biological potentials are encoded in the germ plasm following conception. Each infant is the unique product of the union of specific parental gametes, and all infants share a common phyletic heritage, by virtue of their species membership. Hence, there are both individual and shared biases in development. The genotype, or the genetically programmed potential, cannot be observed. All that can actually be seen in the individual are phenotypic properties, produced by the interaction of the genotype with the environment. Each infant experiences unique physical and social environments that influence the mode of expression of biological potentials, and each exerts an influence on the environment by virtue of attributes present at birth. Environmental factors make their contribution to individual outcomes from the time of conception, when the developing zygote interacts with the mother's reproductive system.

The biological endowments of a majority of infants provide them with the potential for healthy development, which might be ensured if two general conditions were met: (1) if environments met the general requirements of infants as members of the human species; and (2) if each environment meshed with the unique characteristics of the infant. Most severely defective genotypes suffer an early intrauterine death through spontaneous abortion, but occasionally some survive to birth and beyond, as occurs in cases of genetically determined malformations or retardation. However, the preponderance of developmental problems demonstrated through behavior can probably

be traced to a failure of the environment to fulfill either a general or a specific need of the infant in question.

On the other hand, there is no denying that some infants are constitutionally more difficult to care for than others, and more easily biased to aberrant development, because of their biological backgrounds. Hence, less environmental leeway is allowed if they are to develop within limits of normality.

For every biologically influenced trait, there exists a range of environments for its optimal expression, some environments better than others, depending on the individual infant; and in different environments, trait expression may differ. The environmental range within which full trait expression will take place varies depending on the trait. Some may be more or less susceptible to environmental influences. For example, infants typically walk at the same general age regardless of whether they were previously carried for most of their waking hours on their mothers' backs or allowed a great deal of floor freedom. Walking is a classic instance of a trait so deeply programmed into the biological growth pattern of the species that it would take a truly extreme, aberrant environment to thwart its expression. Other behaviors, particularly those of a social, emotional, and intellectual nature, seem much more open to environmental influences and potentials more readily suppressed by environmental adversity. This openness promotes a high degree of adaptation, but it also leaves the individual vulnerable to unfavorable circumstances that may take development off its optimal course.

The neonate's abilities. "Buzzing, blooming confusion" was the phrase psychologist William James (1890) once used to describe the experience of the newborn. While James' language was particularly colorful and noteworthy, he was not alone in viewing the neonate's world in such a manner. Indeed, until relatively recently, there was a tendency for descriptions to emphasize the newborn as an undifferentiated organism bombarded from all directions by incomprehensible and equally potent sights, sounds, tactile sensations, and smells.

In the absence of a reliable body of observations, it is perhaps understandable that characterizations of infancy were based more on underlying beliefs about the nature of reality than on data. More sophisticated technologies have permitted current researchers to view the infant directly and hence to move from global constructs to levels of inference tied more or less precisely to data. The resultant picture is one very different from that painted by James.

The newborn who is emerging from careful observation appears to be differentiated, active, and stimulus-seeking, possessing a circumscribed and highly organized behavioral repertoire, microrhythms, such as those involved in sucking and crying, and macrorhythms involved in sleep-wakefulness and rest-activity cycles.

In this new view of the first days and weeks of postuterine existence, experience is seen, not as superimposed on a *tabula rasa* but as a modulator of behavioral and physiological parameters already present. (For a thorough review of research in the neonatal period, the reader is referred to Emde and Robinson, 1979.) Given an increasing body of evidence for its presence at birth, one is led to ask what function differentiation serves in promoting interaction with the external environment and in shaping it. While neonatal capabilities can be viewed from a number of vantage points and though a number of questions may be posed, in the brief summary that follows emphasis is on value in promoting sociability and attachment.

State. Basic to understanding the neonate is the concept of state. "State" refers to constellations of physiological variables or patterns of behavior which repeat and are relatively stable (Prechtl et al., 1968). The concept provides a framework by which to understand the progression from endogenous control in early infancy to exogenous entrainment of behavior and rhythms to the environment, and hence a context for understanding variations in behavior.

There exist a number of descriptive systems for state, all recognizing two distinct types of sleep, an active one with irregular breathing and rapid eye movements, and a quiet one, with few eye movements and relative quiescence. All systems recognize two states of wakefulness, one quiet and alert and the other active; and all recognize a state of crying (Emde and Robinson, 1979). The newborn's responses are very much dependent on state. It is in the alert inactive state that the infant is most capable of attending to and responding to the environment. Virtually all current descriptions of newborn behavior now make precise mention of the state in which it occurs, and neonatal testers recognize the need to assess performance in a uniform state if comparability among infants is to be attained or the full range of individual abilities is to be measured.

An important task in early caregiving is the regulation of states, particularly those of sleep and wakefulness, and such regulation is thought to be influenced by variations in the caregiving environment (Sander and Julia, 1966; Gaensbauer

and Ende, 1973). Likewise, time-in-state variations among infants and ease of transition from one state to another can influence caregiving patterns.

Reflexes. Early catalogs of infant ability tended to focus on the reflexes which were thought to exhaust neonatal behaviors. Even though this notion has been superceded by more current ones, which emphasize perception and its organization in the newborn period, nonetheless reflexes form an interesting facet of the newborn's behavior, preadapted as they seem to be to the environment. In general, reflexes are of two kinds, those that withdraw the infant from painful stimulation and those that facilitate approach to pleasurable stimulation, most likely to be coming from human caregivers. For instance, if the newborn's cheek is stimulated, the head will turn in a search for the nipple, which, if found, will stimulate sucking. If touched, the infant's hand will grasp an object tightly, a behavior that may aid in the maintenance of contact with a caregiver.

Perception. The most current and exciting research into the neonatal period focuses on perceptual abilities. The human visual system is foremost among them in the amount of attention it has attracted, because it is relatively mature at birth in comparison to the others and because of the importance researchers have placed on the role of distance receptors in imprinting, early ego development, and the formation of social bonds. The human newborn's bias to look preferentially at facial patterns, with the implication of innate biases to respond to facelike qualities, was documented by Fantz (1963, 1967; Fantz and Nevis, 1967). Since then, researchers have found that the newborn possesses abilities to distinguish brightness intensities, to track movements, and to discriminate different kinds of patterns (see a review by Haith, 1976).

In the realm of hearing, there is similar evidence that the infant comes equipped with biases to respond to human caregivers. The newborn apparently is especially responsive to sound frequencies in the range of human speech (Eisenberg, 1965, 1969), and some (e.g., Hutt et al., 1969) have found that young infants respond to and prefer speechlike sounds. Wolff (1963) found that infants in the early weeks were more likely to smile in response to a high-pitched voice than they were in response to other stimuli. Typically such a voice is possessed by a female caregiver. Condon and Sander (1974) have reported that newborns at the first day after birth move in synchrony with the structure of adult speech. Attention to speech sounds, espe-

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cially those with a pitch typical of the female, combined with a tendency to look at the face (the source of vision and sound) strongly suggests a bias to respond to stimuli most likely to be forthcoming from humans and hence to engage in social interaction.

Less work has been conducted on neonatal abilities in the other senses, but it is worth noting that infants possess an ability to make discriminations in smells, temperatures, and tastes (see Emde and Robinson review, 1979). Korner and Thoman (1970) found that vestibular stimulation of the infant is most likely to promote the state of alert inactivity, and such stimulation is typically found when the infant is held over the shoulder. Bell and Ainsworth (1972) have found that the optimal way to sooth an infant is by holding. Hence, it would appear that the infant is preadapted both to respond positively to physical contact (and thereby to be in more or less frequent contact with a caregiver) and to gain maximum information from the environment while in contact.

Affect. Crying is not only a state but is one of the most compelling ways the infant has for calling to the caregiver to come and change some condition. Indeed, crying is so universally attended to and so unpleasant to most adults that some (e.g., Bowlby, 1969) have talked about it as an innate releaser of caregiving behavior. While this claim is open to debate, it is difficult to deny that crying is the most effective means infants possess for bringing adults close to and even into bodily contact with them.

A number of studies have attempted to distinguish types of cries (Wolff, 1969; Wasz-Hockert et al., 1963). There appear to be both a basic hunger cry and a pain cry. The pain cry is particularly disturbing to mothers and the most compelling of immediate action. There is evidence that experienced mothers tend to have a more relaxed attitude about other types of crying than primiparous mothers (Wolff, 1969; Bernal, 1972; Thoman et al., 1970).

Generalized fussiness, not related to hunger, is more common in the first 3 months of life but declines thereafter (Emde et al., 1976). Such fussiness may have an adaptational advantage in ensuring survival by promoting closeness with a caregiver at times not necessarily taken up by feeding. Generalized crying tends to decline at about the time that social smiling emerges.

Unlike crying, smiling, yet another method of communication, is not present at birth as a full-fledged response or signalling system. Although smiling is less immediately compelling of

action from the caregiver, nonetheless it is perceived as highly positive. In the early weeks of life, endogenous or state-dependent smiling occurs during sleep or drowsiness. Mothers typically do not regard these smiles as indicative of pleasure or as a function of their caregiving actions. Exogenous smiling begins in an irregular, sporadic fashion in the first month of life (Emde and Harmon, 1972), and typically it is not until 2 or 3 months of age that it occurs with regularity in response to environmental stimulation. Exogenous smiling follows a developmental course during which it is elicited more readily first by auditory stimuli, then by visual stimuli coming from faces, and later on more specifically and discriminatingly in response to the faces of familiar caregivers. In this context, early eye-to-eye contact is also seen as a potent releaser of maternal caregiving. Robson (1967) noted the special pleasure that mothers take when their infants "see them" and found that 4 to 6 weeks constituted a transitional period during which mothers, because of greater responsiveness in smiling and in eye-to-eye contact, became more confident that their infants were becoming human.

In summary, newborns, while still very much under control of internal states of quiescence and arousal, but before they can voluntarily control or shape the interaction by means of locomotion or directed behaviors, possess a repertoire of equipment designed to compel and entice caregivers into interaction. Indeed, so appealing is the infant to most adults that Lorenz (1937) has talked about "babyness" as a potent drawing power in the physical appearance of the newborn. Throughout the first year and beyond, there is a progressive increase in voluntary control and in the adaptation of infant behavior to the caregiving environment.

The evidence from studies of infant capabilities suggests strongly that newborns are biased in definite prosocial ways and that they are highly effective in shaping interaction with caregivers. Infants are most responsive to ministrations coming from humans, and the reciprocal interaction that ensues helps to ensure their survival during a long period of psychological and physical dependence on a mature caregiver.

The Infant's Contribution to Mental Health: Individual Differences

> *Each individual ego is endowed from the beginning with its own peculiar dispositions and tendencies.*
> —S. Freud, *Analysis Terminable and Interminable*

The role of constitutional differences in susceptibility to adverse environmental conditions has long intrigued clinician and researcher alike. How else to explain findings that some survived and even thrived under unfavorable circumstances while others succumbed? There was an undeniable appeal to the notion that if stable, fundamental differences could be isolated in earliest infancy, before experiential variability had clouded them over, then a giant step would be taken toward understanding mental illness.

As we shall see, this task has proved to be a difficult one. A number of techniques for assessing the neurological and behavioral status of the newborn are now available, but their long-term predictive value has been generally disappointing. Reviews of earlier studies of prediction from infancy to later life (e.g., Rutter, 1970) show a similiar lack of success, except in cases where there was evidence of early massive abnormality. Researchers, initially perplexed by such negative findings, are now reframing their questions. In light of individuality and interaction with changing environments, they are discarding models of linear relationships between birth status and later outcome (e.g., Sameroff and Chandler, 1975). Other students of individual differences are assessing neonates in order to view the short-term influence of individual differences on the shape and quality of the infant-caregiver interaction. The following section is a selective review of some work on infant individual differences and a summary statement of some issues involved in their study.

Standardized neonatal assessments. In the past 30 years a number of newborn assessments have been developed to serve varied needs of medical and behavioral scientists and clinicians. (For a fuller description of them, see a review by St. Clair, 1978.) The earliest ones (e.g., Prechtl and Beintema, 1964) concentrated on reflexes and neurology and were devised primarily to detect immediately central-nervous-system damage resulting from obstetrical complications, such as toxemia and difficult deliveries. To assess the immediate status of newborns while in the delivery room, Apgar in 1953 devised a simple test, bearing her name and based on five signs—heart rate, respiratory effort, reflex irritability, muscle tone, and color. This test is widely used in obstetrical units today.

A shift in test development, from neurological to behavioral assessments, started in the 1950s and reflected a belief that behavior was closely related to the underlying neurological status of the newborn. Three behavioral tests, the Graham (1956),

Rosenblith's modification (1961) of the Graham, and the Brazelton (1973), are most widely used. The first two were constructed to distinguish normal from abnormal newborns, the third to make distinctions among normal infants, although all have been used on both normal and high-risk populations. The Brazelton test is the most popular today because many of the behaviors it taps are thought to underlie significant aspects of early social and environmental interaction.

Efforts have been made to assess the value of the tests in predicting later developmental status, and their record is uneven at best, especially when the newborns under consideration come from a so-called "normal" group. In her review, St. Clair (1978) summarizes findings on long-range prediction and concludes that the Rosenblith test has been the most generally successful with a variety of infants of different degrees of risk, but she notes that it is best in predicting specific rather than general outcomes from specific conditions. She also points out that the ideal infant test should not only give a long-term prognosis but also detect immediate neurological abnormality and day-to-day changes in status. She concludes that the Graham excels at the former and the Brazelton at the latter.

Findings of some studies of individual differences. In order for individual differences to be psychologically meaningful dimensions of behavior, they must be shown to be stable over time. Emde and Robinson (1979) have summarized studies dealing with short-term individual differences in the neonatal period and report mixed results. In early infancy, there is some evidence for stability in certain behaviors, such as crying, waking, and alertness (e.g., Korner, 1971). However, despite the importance clinicians (e.g., Escalona, 1968) have placed on activity level in shaping parent-infant interaction, there is little evidence for its stability (Bell et al., 1971).

In a study of relationships between newborn characteristics and later characteristics, Bell and his associates (1971) assessed 75 normal children in early infancy and at 4 years. They found relationships between the two age periods, but surprisingly enough these were inverse rather than straight line. That is, the most overtly intense babies (as assessed on a number of measures) were at 4 years of age the least intense in terms of demonstrating low interest, participation, gregariousness, and communicativeness. In a later review, Bell (1975) brought together other findings indicating that slow, low-magnitude responses to the interruption of sucking during the newborn period predicted interest and active game involvement in the preschool period.

Another pioneer study of individual differences in "temperamental" variables was undertaken by Thomas and his associates (1963, 1968) using maternal reports of child personality at intervals from infancy onward. By means of a system comprised of several dimensions, such as predominant mood, intensity of reaction, rhythmicity, activity level, regularity, and approach-avoidance, children were classified as easy, slow to warm up, and difficult. The researchers, who were also clinicians, provided parents with psychiatric consultations for their children should the need arise. When the children were of school age, approximately 90 percent of difficult children were referred by parents (although the problems for which they were referred were not uniformly of serious magnitudes). Only a small percentage of the easy group and somewhat more of the slow-to-warm-up group were referred. Hence, early temperamental classification provided some predictive value. In general, the difficult children tended to exhibit more temperamental stability over time than the other children, but even this stability was not evident until after the first year of life. Temperamental variables within the normal range of children did not predict temperament at 5 years of age.

Prediction. Two related questions can be posed about prediction and early individual differences: (1) Do differences predict later differences of the same kind (e.g., early activity level to later activity level)? (2) Do assessments of differences predict later significant personality or intellectual factors?

As we have seen, the answer to the first seems to be a qualified "no." Infant characteristics as measured in the first days of life do not seem to relate to later similar characteristics in most studies. In this context, it is interesting to remember the findings of Bell et al. (1971) on longitudinal inversions of behavior and to speculate that stability in patterns may exist, although not in terms of simple linear relationships nor in terms of discrete behaviors. Waters (1978), in discussing the stability of patterns of attachment behavior identified late in the first year of life, noted that stability was to be found only when one looked at configurations of behavior. While part of the current problem in studies may stem from methodological shortcomings or oversights, or from the confounding influence of transient environmental factors such as amount of obstetrical medication, and considering how much is asked in attempting to find clear-cut relationships between measures of discrete behaviors, it is perhaps more fruitful to attempt to find continuities in transformations or in patterns, rather than identities.

The answer to the second question is that some assessments *do* predict later behaviors, but with varying degrees of success. In a later section, we will look at the relative contribution of traumatic birth conditions versus postnatal environmental factors in prediction. Here it should be mentioned that behavioral assessments of newborns have had only mixed success in predicting and have encountered much variability in excellence of prediction depending on the time of re-assessment. The same type of findings hold for the much used Apgar test. In general, variations within the normal range in infancy are less predictive of later behavior or achievements than extremes.

Emde and Robinson (1979) have suggested that genetic determinancy may be more extreme in severe disorders, such as schizophrenia or manic-depressive illness, than in "normal" behaviors, which may be more interactive with the postnatal environment and hence less predictable from initial characteristics. Citing evidence for a qualitative shift in behavioral organization after 2 months of age, they note that more of life is spent in wakefulness after the initial period than in sleep and that wakefulness can be used in new and varied ways. Furthermore, new behaviors (e.g., social smiling, fear of strangers) emerge some time after birth, and, although there is some evidence that they are subject to genetic programming (e.g., Freedman, 1965, 1974), nonetheless they bring about a reorganization of existing behaviors. It may be that the adaptation of a newborn with particular characteristics to a particular kind of caregiving environment may be more constant and that continuities in developmental patterns of individual-environment interactions could be found.

In a review of research on prediction from infancy to later life, Rutter (1970) has noted that early diagnoses of pathology tend to predict later pathology (although there are many misclassifications), but that prediction is poor or nonexistent, within normal behavioral ranges. This latter is not surprising, he concludes, given that the final outcome in development is the result of a thoroughgoing interaction between the individual and the environment. He suggests that, within limited environments, biological variables may play a major role but that, in widely varied environments, the environment may be more important. Sameroff and Chandler (1975) propose a transactional model of development, which stresses the dynamic nature of the organism-environment interplay. The child attempts to organize and structure the environment, succeeds in doing so, and is in turn altered by the changes wrought.

In summary, infant characteristics and variability among them are potent influences on the shape and quality of ongoing interaction. Newborns exert considerable behavioral control over the adults who tend them, and they are responded to differently depending on the demands they make. This picture of activity and individuality corrects a one-sided view of adult-to-child influence and greatly enriches our understanding of human development. Likewise, it highlights the issue of environmental match versus mismatch to the characteristics of a particular infant.

Prediction of the course of development from assessments of early status, thought to be constitutional, is advancing but far from successful. This is not to say that constitutional givens do not influence outcomes but perhaps that we have failed in the past to ask sufficiently sophisticated questions.

Population differences. Yet another interesting facet of individuality among newborns comes to light from studies of variations among populations where gene-pool isolation may have arisen over centuries. Freedman and Freedman (1969) studied Chinese-American and European-American newborns. Because the researchers were interested in observing constitutionally derived rather than environmentally derived behaviors, the babies' parents were matched on socioeconomic level and quality of prenatal care.

During neonatal testing, European-American infants reached a peak of excitement in response to stimulation sooner than Chinese-American infants and were more likely to waver back and forth between states of contentment and upset. The European-American infants showed more facial and bodily reddening, and the Chinese-American infants were calmer and steadier. When the tester placed a cloth over the supine baby's face, Chinese-American infants were likely to respond impassively, European-American infants by turning away or by trying to lift the head up. Oriental infants also stopped responding to a repeated stimulus more rapidly than did the other infants.

When they were picked up, the Chinese-American infants were easier to soothe than the European-American infants, and the former group was also more capable of soothing themselves. In other areas of functioning tested, such as motor maturity, central-nervous-system organization, and social responsiveness, the groups were essentially equal.

The researchers speculated about the long-range developmental implications of the subtle neonatal variability they had observed. They questioned the tendency of social scientists to explain differences among cultures only in terms of social learning, and they noted that, while cultures may differentially reward or punish infant behaviors so that the child is ultimately molded to fit into a particular milieu, biological predispositions may also play a role in determining what becomes the cultural norm. They asserted a holistic position in which the infant is seen as a biosocial organism whose development is a product both of a particular ontogenetic history and of a particular phylogenetic past.

Sex differences. Sex differences are to be found everywhere. A cardinal rule of adult psychology is that men and women should be tested separately since they tend to differ in measurements of personality, preferences, and abilities. Feminists and clinicians alike are wont to cast sex roles and gender identities as potent factors in differential susceptibility to mental illness, and there is little question that one's sex is a most salient determinant of life-style and personal identity. How behavioral (as opposed to biological) differences come into being is a matter of considerable controversy, and many theories, evoking either socialization or psychobiology, have been constructed to explain them. There is a relative abundance of research on sex differences and socialization practices during the preschool and school periods and relatively less on parental and child behavior in the toddler and nursery-school periods, although this situation has been changing recently (e.g., Fagot, 1974, 1978). Research on sex differences in newborns and on differential styles of very early caregiver-infant interaction as a function of sex is relatively sparse, and it provides mixed results. (For more detail on lifespan sex differences and methodological problems in their measurements, see reviews by Maccoby and Jacklin, 1975, and Block, 1976.) Nonetheless since very early behavioral differences have been considered by some to reflect constitutional tendencies, these very early potential sources of individuality will be considered here.

In early infancy, there is some evidence to suggest that females are more sensitive than males to touch (e.g., Lipsitt and Levy, 1959) and to tastes (e.g., Nisbitt and Gurwitz, 1970) and that they fixate the human face longer (Hittelman and Dickes 1979). In a review of sex-difference findings, Korner (1973, 1974) has discussed studies which show differential treatment of males and females (e.g., Moss, 1967; Moss and Robson,

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1968, and which indicate that mothers hold boys more and talk to girls more. She suggests that such differences may be due to subtle differences in the infants themselves as well as to early differential socialization. For example, males are generally more irritable and less sensitive to touch than females, which characteristics in turn may elicit more maternal handling.

Findings of sex differences must be interpreted in light of the fact that female infants are generally 1 to 4 weeks advanced over males in motor and neurological development, and hence at least some early differences may result from the influence of differential maturity of the sensory areas tested (Tanner, 1974). From studies of fetal-neural development (see Money and Ehrhardt, 1972; Stoller, 1972, 1973), we know that the embryonic brain is at first no different in males and females. Early in prenatal life, a brief spurt of androgens is triggered in male infants, which leads to masculine characteristics in fetuses carrying XY chromosomes. This androgenization has been demonstrated to have behavioral correlates in newborn laboratory animals, and it may also have a similar effect in humans. Money and Ehrhardt cite indirect evidence of "tomboyish" behavior in girls whose mothers had received androgens in early pregnancy, and they propose that prenatal conditioning of the brain by sex hormones leads to a propensity to behave in ways characteristic of biological sex. While such biases could be expected to be evident in the newborn, it may also be that others would not become evident until puberty triggered renewed output of sex hormones. Maccoby and Jacklin (1975), in summarizing findings on sex differences in the newborn period, do not find them striking or consistent and believe that similarities between males and females are much more evident. From a mental health standpoint, one is led to ask whether differences, if they exist, have consequences for early interaction with the environment and what the outcome might be of the current move toward similar rearing of the two sexes.

Differential susceptibility. To further complicate an already complicated picture of individual differences, there is some evidence that responses to the same objective environment may differ as a function of constitutionally or genetically conditioned variables. Much of the direct evidence for differential effects comes from the animal literature, where more stringent experimental control over intraorganismic characteristics can be exercised than is the case with human subjects (e.g., Cooper and Zubeck, 1958). But even in studies of human schizophrenia,

there is evidence for differential susceptibility under conditions of environmental stress (e.g., Gottesman and Shields, 1966).

There is evidence that throughout the lifespan males are more susceptible to environmental influences than females. During the prenatal period, there is a higher rate of spontaneous abortion in males, and they are more likely to be born with birth defects (Shapiro, 1954). Later they exhibit a higher rate of behavioral disorders. Their shorter average lifespan may also be under genetic control (Madigan, 1957). Significant correlations have been found between early maternal-care practices and adult personality for males but not for females (Schaefer and Bayley, 1963; Bayley and Schaefer, 1964), which findings were interpreted as indicating greater susceptibility of males to environmental influences.

From a mental health standpoint, such findings may have important implications, suggesting as they do that individuals differ in their inherited susceptibility to abnormal development under conditions of adversity or stress. That is to say, there may be genetically conditioned differences in adaptability to changing environmental conditions (Glass, 1954). The existence of constitutional determinants does not argue against the influence of other developmental adaptations learned in the life history of the person in stress resistance, but it may help explain why perfect prediction of outcome from a knowledge of exogenous variables is highly unlikely.

Defining Effective Environments for Infant Mental Health

Common human environments in infancy. In a chapter entitled "An Evolutionary Perspective on Infant Intelligence," Scarr-Salapatek (1976) argues that human infancy is a variation on and an advancement of a more general primate theme. The primates are characterized by a relatively long period of immaturity, attachment to a caregiver upon whom they are dependent, and a type of intelligence, based in manipulations of the material environment, that Piaget first labeled "sensorimotor." Because of continuities between human and nonhuman primate infants, Scarr-Salapatek asserts that evolution must be very important in understanding their patterns of behavior and also the mature behaviors serving to promote their survival, such as caregiving and reproductive patterns. Obvious differences aside, there are sufficient similarities between contemporary ape and human infants to surmise that the patterns originated in a common phylogenetic past. For the survival of the species, two environmental patterns appear to be necessary: (1) the infant-

mother dyad, and (2) the larger social group in support of the dyad. Because they are so critical, it is not likely that their occurence, even in humans, has been left entirely to learning via social proscription and custom.

While human infants share characteristics of the primate order, they appear in them in an exaggerated form, so that they are most helpless among them at birth. With a large brain and little mobility, the human infant must be protected and educated over an extended period by "big-brained" caregivers. While physical immaturity has obvious drawbacks, it also confers great advantages. The human caregiver not only provides physical safety and nurture but, by virtue of individual ability and position within the social group, equips the infant for the attainment of human cultural achievements and hence increases the relative fitness of the child within that group. Bruner (1972) views infant immaturity and the protection necessitated thereby as freeing the infant to work out knowledge, sensorimotor and social, without risking the adverse consequences that might befall an adult.

There exist patterns of development, such as object permanence, motor skills, language, and attachment to a caregiver, that emerge in virtually all nondefective human infants in virtually all normal human environments. That this is so does not imply that environments have no effect or that environments could not be engineered so as to eliminate these infant tendencies, but it does imply that human societies work so as to provide the conditions for their emergence from a strong bias which is difficult to divert from its course. The species pattern observed in human infancy is an interplay of genetic preadaptations of organism to environment and of developmental adaptations to unique features of the environment. Variability observed among infants in the attainment of the patterns is limited by canalization and by common human environments.

Canalization refers to a predisposition for development of certain forms of adaptation to be guided along internally regulated lines. Environmental features are necessary for complete development, but the direction of development is difficult to deflect. For canalization to work as an effective species mechanism, environmental inputs necessary for a behavior's appearance must be almost universally available to the species.

Behaviors can be viewed as more or less canalized, those strongly canalized rebounding and returning to a normal level even after a period of deprivation. To cite a classic example (e.g., Tanner, 1963), after brief physical illness, during which growth slows or stops, children typically go through a catch-up

phase and attain their age-appropriate height and weight. Biases in development, based on general primate and uniquely human species patterns, exert a strong forward pressure, but specific behaviors vary in the degree to which an environment can deviate before anomalies will occur. Elsewhere in this volume it has been suggested that social and emotional skills are more easily deviated than motor skills, or, as Scarr-Salapatek argues, more than basic sensorimotor intelligence.

Since infant development over the ages has occurred in the context of normal human environments, developmental fixity is unnecessary. There was no requirement that behaviors almost certain to be acquired experientially in social groups be rigidly built into the genotype. All infants would have close contact with mothers and conspecifics and with tools and materials, thus having the opportunity to learn social bonds, a human language and object play (Scarr-Salapatek, 1976). What has evolved in the genotype is a bias toward acquiring these forms of behavior, or what Dobzhansky (1967) called "human educability."

It is thought-provoking to view infancy as intermeshing with and dependent upon certain environmental features for the fulfillment of healthy development. What are the consequences of environmental failure to provide common experiences? One would surmise they are very dire indeed, and such environments are difficult to find. Environments that provide the minimums necessary for the emergence of patterns may yet be deviant in other more specific regards that thwart mental health. For instance, that the abused child can be attached to the abusive parent, despite severe punishment received, at once bears witness to the strong directedness of development and the difficulty with which behavioral propensities are eradicated, and at the same time highlights the fact that gross anomalies can occur within the context of a very broad pattern. What are the limits of tolerance for variations in ordinary human environments so that normal development is ensured? From the perspective of this volume, one could ask whether separation from a caregiver to whom the infant is attached, or multiple caregiving in infancy, constitute merely variations on the one-to-one theme commonly found in primate social groups, variations that may go against "natural" biases but have no negative impact or constitute threats to the emotional well-being of infants and children so reared.

In a related vein, an important consideration raised by the notions of ordinary human environments and strongly biased developmental thrusts is that of the ease or difficulty with which development is permanently put off course by depriva-

tion or other adversities. Kagan and Klein (1973), in a study of Guatemalan children, concluded that caregiving practices significantly retarded infants' rate of development but that such retardation was not permanent because later practices were compensatory. Biases in development were so strong as to be deflected only temporarily. There are alternative interpretations of the data, some of them raised by Scarr-Salapatek (1976). Serious questions exist about the accuracy of the tests of intellectual skills on which the study's conclusions were based, and the evidence for environmental retardation of the infants' motor skills argues against extreme canalization. In this regard, Scarr-Salapatek asserts that canalization does not imply that species-typical behaviors will develop under conditions that are atypical of those in which their evolution occurred but that, within a range of natural environments, most genotypes will develop similarly. However, the Kagan and Klein study is provocative because of its implications (later reflected in Kagan et al., 1978) that contemporary psychologists may have neglected to consider sufficiently the strong thrusts in development and its self-righting tendencies.

Operating within an evolutionary context that he considers critical for understanding infant attachment, reciprocal caregiving, and later emotional development, Bowlby (1969) has stressed the importance of more specific and fine-grained environmental variations for the infant's mental health. He has viewed a broad range of individual psychopathology as stemming from variations in environments, many of which are to be found in so-called "normal" situations as well as in unusual ones. In this way, he stays within a clinical tradition in which specificities of infant-caregiver interaction are thought to have major consequences for the individual's mental health, while relating the adverse effects of particular kinds of interaction to deviations from the infant's "environment of evolutionary adaptedness." Although in this position the end of infancy does not mark the end of opportunities for learning new patterns of relating which may compensate for and correct earlier, less optimal ones, nonetheless emotional development is not seen as rebounding so dramatically from early adversity even if a later adequate environment is provided.

The contrast between these two generic positions may be overstated, since Kagan and his associates deal primarily with cognitive development, which may have a somewhat different course than the social-emotional development which Bowlby considers. Nonetheless it serves to highlight two questions. Related, they are: What is the role of early experience in deter-

mining later development? and: What evidence is there for the existence of "sensitive periods" in early development during which learning takes place most easily and after which it is difficult to undo? Given the implications of developmental directedness and rebound, how plastic is the infant in overcoming early adversity? To the extent that there is flexibility, how long can adversity continue and how severely inadequate can an environment be before there is irreparable damage to functioning? And given the fact that excellent or inadequate environments tend to persist throughout childhood, how important are such considerations as a practical matter?

In summary, there are broad general requirements for environments in human infancy; they are met almost universally on a societal basis. Patterns of caregiving for infants and the support of mothers and their children are overdetermined by phylogenetic, hormonal, and societal mechanisms. Human infants and the environments which serve to nurture them are flexible but within limits. It can be asked how exquisite is the organism-environment interlocking and how variable can environments be before they deviate too much from the one in which infancy originally evolved so that developmental anomalies occur?

Few infants have no human caregivers (reports of feral children aside), and while a larger number may have so little focused interaction with any one as to be unattached to a human or to fail to learn a human language, many more suffer from aberrant treatment at the hands of those to whom they are attached. It is with such aberrations within a more general pattern that clinicians usually are concerned. At yet an even more specific level of consideration, human environments vary greatly in the support they provide for optimal development. The provision of environmental enrichment in infancy may have a permanent beneficial influence. Beyond infancy, the advantages that can be conveyed by parents who themselves have attained high levels of cultural achievements are obvious.

Hence, we can work from very broad to very specific levels in understanding possible environmental influences on mental health. The infant-caregiver relationship can be considered in the context of the broader social environment, which supports the emergence of the primary relationship. All too often in developmental psychology and clinical psychiatry, the role of the social milieu has been neglected in considering the etiology of individual mental illness; today both contemporary social psychologists who are concerned within urban settings, as well

as ethologists who view behavior from an evolutionary perspective, are asserting the importance of the social setting.

In order for infants to take advantage of "immaturity" and thereby gain from the environment social and physical knowledge, relationships to a caregiver and to a larger group must exist. In order to optimize development, these relationships must be optimal. An evolutionary view of infancy and of human environments preadapted to infancy provides a basis for further considerations of the effects of variations in environmental conditions on development.

Early experience: Some issues. Empirical support for the notion that early experiences are potent determinants of later development comes both from experimental and naturalistic studies of animals and from human clinical studies. In the case of the two former traditions, evidence tends to be direct and systematically sought; in the case of children, it is usually either epidemiological or opportunistic, gathered from unfortunate circumstances in which the subjects have been institutionalized for long periods and/or separated from attachment figures.

The exact dimensions of early experience that give it its salience, what is stored in physical and psychological structures, and the extent and generality of changes wrought, are issues too complex to cover here. (For a treatment of these issues and a thorough review of the literature, see Thompson and Grusec, 1970). But from the viewpoint of the question under immediate consideration—early influences on mental health—a general principle will serve to orient the reader. It is that the younger the organism, the less redundancy there exists in homeostatic or self-righting systems, so that the less buffering there will be against adverse environmental influences. The very young are both very plastic and very unstable as compared with more mature individuals.

Many studies of early experience have focused on two related aspects: the generally advantageous or disadvantageous influences of environmental enrichment versus restriction on physical structures, intellect, and motivational systems; and the role of critical or sensitive periods in early development. Environmental influence is considered to begin prenatally, when adverse conditions, induced by maternal dietary, drug, or other habits, and perhaps even emotional state, can influence the fetus, and to continue postnatally, when inappropriate rearing conditions or lack of social and/or environmental stimulation have been demonstrated to have negative effects on intellectual and social behavior of young children. This section starts with a mention

of some animal studies which highlight early experience and sensitive periods as they may have implications for human development. It proceeds to a review of some human studies of the influence of prenatal environments on the development of the fetus and of postnatal environments on the child's mental health.

The animal heritage. From animal studies, there is indication that early general environmental enrichment versus restriction can affect intelligent behavior (e.g., Hebb, 1949), underlying brain chemistry and structures (e.g., Rosenzweig, 1966), and a variety of social and exploratory behaviors (e.g., Harlow, 1958; Menzel et al., 1963).

The behavioral systems most strongly influenced by early experiential manipulations appear to be those involved in animal emotionality, as measured operationally by defecation, avoidance, shock escape, responses to stress, exploration, and social dominance (Thompson and Grusec, 1970). For example, rats handled gently during infancy were less emotional and more exploratory than nonhandled controls and more resistant to stress during adulthood (Bernstein, 1952; Weininger, 1953). Because emotionality and motivation are involved in so many measures of "intelligent" animal behavior, it is difficult to disentangle the effects brought about by environmental manipulations directly on cognitive capacity versus indirectly on emotions that can aid or impede performance in a cognitively oriented test situation. In a study of deprived rhesus monkeys, Griffin and Harlow (1966) found that learning was less impaired by early social restriction involved in rearing by an inanimate surrogate than were a variety of social behaviors. The fact that social animals should suffer deficits in social behaviors after deprivation is not surprising; the finding that isolation appeared to destroy social potentials if it continued for 6 months to 1 year was indeed more so, and it had important implications for early human intervention efforts. The discovery of relationships between heightened and incapacitating emotionality and lessened exploration of the physical environment in deprived animals may provide a tie-in to understanding relations between emotion and cognition in humans.

The ethological contribution. Lorenz (1935) wrote of a form of social learning he had discovered in hatchling precocial birds. Rather than serving only a narrow ornithological interest, "imprinting," as he called it, has become a paradigm for early social learning in humans. Imprinting occurred during a brief period

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in the early life of the birds when they started to follow a moving object (in nature, the mother) and after which time would follow it to the exclusion of other objects or birds. Lorenz thought that imprinting occurred during a "critical period," after which it was irreversible and was a learning of species rather than individual characteristics.

Subsequent work in the imprinting tradition has been undertaken, and there is evidence that it, or a very similar phenomenon, occurs in a range of animals, notably the mammals (e.g., Cairns, 1966). Research has also demonstrated that imprinting is neither so drastically time-limited nor as irreversible as once was thought. Hence, the less restrictive term, "sensitive period," has come into more general use to refer to a developmental time, when the organism appears to be especially responsive to certain stimuli and susceptible to learning of a particular kind, after which time old learning is difficult to undo and new learning of the kind that should have occurred previously is difficult to achieve. For instance, working with puppies, Freedman et al. (1961) found that the extent to which a dog would make social contact with another dog was related to the amount of social contact it had received between 4 and 14 weeks of age. Harlow (1958) found that monkeys reared by immobile surrogates during infancy and deprived of contact with a natural mother and/or with conspecifics were later impaired in social, parental, and heterosexual behaviors. Early experience, or, stated somewhat differently, absence of appropriate experience, then, appeared to affect not only behaviors seen immediately after the isolation or deprivation ended but also behaviors not yet even in the animal's repertoire. Caldwell (1962) examined the usefulness of the critical-period hypothesis for understanding the development of human filiative behavior in infancy, and Bowlby (1969) proposed a functional similarity between the processes of attachment in human infants and imprinting in birds.

Prenatal environmental influences: Humans. Research on prenatal environmental influences on infant development is of two general kinds: that which attempts to establish the effect of some teratogenic agent on the fetus, and that which attempts to establish a link between maternal emotionality and fetal or newborn condition. While evidence in humans is epidemiological and retrospective rather than experimental, there appears to be little question that a variety of substances ingested by mothers, especially in the first 3 months of pregnancy, can have adverse effects. It is during that sensitive period that basic systems and

physical structures are still rapidly developing and differentiating and most likely to be damaged. For example, thalidomide was responsible for a variety of malformations when taken by women early in pregnancy (Taussig, 1962). Some infections, notably German measles, have been shown to have damaging effects on the fetus, particularly if contracted early in pregnancy. Maternal thyroid deficiency, use of narcotics, irradiation (especially in the pelvic area), and nutritional deficiencies have been implicated in neonatal dysfunction, intellectual retardation, and physical malformation (Thompson and Grusec, 1970).

Evidence from a large-scale study of children born in Great Britain in the 1950s has shown a relationship between maternal smoking and low infant birth weight, the latter factor being implicated in increased neonatal mortality. (See Butler and Alberman, 1969.) In a variety of physical birth defects, neonatal dysfunctions, and intellectual retardation, recent studies have also implicated even social drinking of two to three ounces of alcohol a day by the expectant mother (for reviews of research on the effects of alcohol consumption during pregnancy, see Waren, 1977; Weathersbee and Lodge, 1978).

Relationships between fetal outcomes and stress endured by a mother during her pregnancy are less well-established, partly because it is difficult to disentangle maternal genetic contributions to the infant from those transmitted via the placenta. Similarly, a disorganized or stressful prenatal social environment is likely to persist after the infant's birth and hence to exert a continuous influence. Sontag (1941) reported that chemicals appearing in a mother's blood during emotional stress could be transmitted to her child. He also found increased fetal movements in mothers undergoing stress, so that after even brief maternal stress the fetus would continue to be affected for several hours. In a literature review, Stott (1971) reported that in Great Britain and Germany during World War II there was an increase in birth defects that could not be accounted for in terms of dietary deficiencies. He also studied retrospectively the pregnancies of women who had given birth to mongoloid infants (Stott, 1957, 1958) and found a higher incidence of emotional crises in their pregnancies than in pregnancies of a control group of mothers with normal children. Others have found a higher incidence of pregnancy complications among mothers of children diagnosed as autistic (Pasamanick and Knobloch, 1966), more complications of pregnancy and delivery in depressed and schizophrenic women (Sameroff and Zax, 1973), and higher rates of prematurity among women with psychoso-

matic complaints (Blau et al., 1963). Yet other studies have found relationships between emotional difficulties and prenatal and delivery complications (for a review, see McDonald, 1968), which suggests that the personality of the mother may contribute to vulnerability in the offspring. Alternatively, Moss (1970) has suggested that certain fetuses may be more biochemically stressful to the mother, hence making her appear more negatively emotional. More research in this area is needed.

A great deal of research is being undertaken on the effects of obstetrical medication on the fetus and newborn. The immediate depressant effects of various narcotics and of general anesthesia on the fetus are well established. While such depression may be weathered relatively well by a healthy, full-term newborn, heavy dosages of medication may lead to serious complications in infants already at risk by reason of prematurity or other physical factors. (For a review, see Watson et al., 1970.) More recent research has documented decrements in sensory functioning as late as 4 or 5 months after birth in normal infants whose mothers received obstetrical medication (e.g., Aleksandrowicz and Aleksandrowicz, 1974; Friedman et al., 1978). While the long-term influences of moderate amounts of obstetrical medication on infants is thought by most obstetricians to be negligible, evidence from psychologically oriented investigators suggests at least caution in accepting such a conclusion.

Human clinical studies of children in exceptional circumstances. A number of early clinical studies with human infants in institutional environments, some too young to have formed an attachment to any one figure at the time of placement, some separated from parents to whom they had formed at least a rudimentary bond, indicated deleterious effects on intellectual, social, and emotional development. Ribble (1939, 1944) found that long-hospitalized infants who received little human social contact but adequate physical care suffered from a physical debilitation which she labeled "maramus." This "withering away" of babies under conditions of excellent hygiene she attributed to an absence of psychological mothering, particularly handling. In a later study, Spitz (1945) compared the development of infants raised in a foundling home with infants raised in a nursery in which they were cared for by their mothers or by full-time mother substitutes. In the foundling home, infants had few toys and could see little of their surroundings because sheets were hung around their cots (supposedly a measure to prevent contagious diseases from infecting them). They interacted with busy nurses only at feeding time. When they were assessed late in the first year of life, the foundling-home infants exhibited profound developmental retardation. Left as they were in cots throughout the day, they had made deep hollows in their mattresses, so that

by the time they were able to turn over, they were mechanically prevented from doing so.

In addition to retardation among the foundling-home infants, Spitz also noted extreme friendliness to strangers (unusual in home-reared infants of this age) or extreme fear. In contrast to the nursery children, who were developmentally normal and in good health, the foundling-home children were extremely susceptible to infection and epidemic disease, and many died despite the hygienic precautions that had been taken by the staff. Like Ribble, Spitz concluded that the infants were suffering from a psychological absence of mothering. In a follow-up study (1946) he noted their continued retardation as compared with the nursery controls, this in spite of substantial improvement in the physical conditions of the home and increased interaction with staff members, and he concluded that the children had been irreversibly damaged by their early experiences.

Provence and Lipton (1962) likewise found in infants in a depriving institution, severe retardation of social responsiveness, language development, body awareness, and pain avoidance. They concluded that the effects were permanently deleterious. In a series of studies, Goldfarb (1945a, 1945b, 1947, 1949) compared the development of children who had lived in a depriving institution up until the age of 3 (at which time they had been placed in foster homes) with children who had gone to foster homes from the institution at age 1 or before. The institution was characterized by frequent staff changes so that the infants were unable to form a permanent relationship with any one, and all infants had been separated from their natural parents early in the first year of life. At the time of his investigation, when the children were between the ages of 10 and 14, all were living in foster homes. The long-institutionalized children were deficient in intelligence, ability to conceptualize, and speech development. They were more restless, poorer in school achievement, less popular, less socially mature, and more agressive than the children who had left the institution at age 1 or before. The long-institutionalized children were marked by an insatiable need for affection and a simultaneous inability to form close relationships. Their relative lack of guilt over transgressions completed a picture similar to that labeled by Bender (1947) as "psychopathic." Their numerous deficits were blamed by Goldfarb on inadequate mothering in the first 3 years of life.

In 1951, Bowlby, in a monograph for the World Health Organization, summarized a number of studies, including his own, and came to the conclusion that a child deprived of maternal care in the first years of life could be more or less permanently

impaired physically, socially, and emotionally. Deprivation of focused maternal care and/or frequent changes in mother figures in the first 3 years of life could produce an affectionless character. Through his work and the work of other researchers, some of them named above, international attention was drawn to hospital conditions to which young children were subjected and to adoption and placement practices. Changes ensued, so that today hospitalized children are frequently accompanied by their parents, and infants are placed in one-to-one foster care as soon as possible.

Despite the great contribution of this work, some of its conclusions have been qualified by later researchers. For instance, methodological criticisms have been made. Are children who remain unplaced in institutions for long periods of time truly comparable to children fostered more rapidly? (In Goldfarb's work, the long-institutionalized children were equivalent or even superior in terms of natural parental background variables.) Other criticisms center around the proposition that institutionalization and deprivation lead invariably to psychopathy in all instances. In a 1956 study, Bowlby et al. studied children 6 to 14 years of age who had been in a sanitarium for varying amounts of time in early childhood. The children did not show deficits in intellectual functions, and while their social behaviors appeared impaired, few were affectionless; over half had good relations with peers. Institutionalization, then, was not a uniform experience in terms of effects but was mediated by such factors as quality of substitute social care, quality of environmental stimulation, age of the child, and length of stay. Casler (1961) and Rutter (1972) suggest that part of the effects of what has been labeled "maternal deprivation" may have been due to environmental deprivation; and some studies (e.g., Freud and Burlingham, 1944; Rheingold, 1956) have failed to document intellectual retardation in institutionalized infants. Freud and Dann (1951), studying six children who had lived together in concentration camps for most of their lives until the age of 3, failed to find emotional or social deficits or lack of attachments at least to each other. On the other hand, in a recent study of young children in very good British institutions (Tizard and Tizard, 1971) where they saw their natural mothers on a continuing basis and had a special nurse to whom they focused their affections, institutional children were still more concerned about the locations of their attachment figures and more afraid of strangers than were comparable home-reared control children. In more recent studies (Tizard, 1977; Tizard and Hodges, 1978) less than half of the institutional children at age 8 were

described as closely attached to their housemothers and they tended to seek more attention. At school, the institutional children were more attention-seeking, restless, disobedient and unpopular.

In brief, some of the more devastating effects of early institutionalization, especially on intellectual development, may be due to environmental deprivation or absence of stimulation. Institutionalization need not produce psychopathy or severe personality alterations if adequate mothering figures are available to the child, but even very good institutions may fail to produce children as emotionally secure as home-reared children. While it may be possible to parcel out early deprivation into maternal-social versus environmental components, in practice a mother not only provides tactile stimulation, stroking, and cuddling but also mediates the physical environment for the very young child. Hence, a child without a mother may in effect be environmentally deprived. The Goldfarb study was an example of research where the effects of deprivation of maternal care could be examined without confounding them with the effects of maternal separation. However, the infant's response to environmental deprivation may also be a function of whether or not he or she has formed an attachment to a figure. In children over approximately 6 months of age and previously reared by a stable figure, effects of the severance of a bond may co-occur with the effects of absence of stable mothering in the new environment.

In a study of infants undergoing hospitalization, Schaffer and Callender (1959) found that those 6 months of age or less did not actively protest separation from the mother and readily accepted mother substitutes, while those 7 months of age or older protested. Schaffer (1958) also reported the existence of two posthospitalization syndromes—global and overdependent. Global patterns were mainly found in infants under 7 months of age, overdependent ones in those older. Younger infants, upon their return home, were withdrawn from social interaction and preoccupied with the physical environment. Older children tended to cling to their mothers, to cry when left alone, and to exhibit heightened fear of strangers, suspicion even of familiar figures, and feeding and sleep disturbances. Some older infants exhibited aspects of both syndromes. Hence, the young babies may have been responding to the absence of stimulation and the older ones predominantly to the severance of a bond.

In a classic study, Robertson and Bowlby (1952) outlined phases of children's response to separation in institutional environments for various lengths of time between the ages of 1 and

4. During the first phase, children protested. During the second phase of despair, they were withdrawn and failed to be comforted by the substitute caregivers. During the phase of detachment (which might occur if the separation was prolonged), children regained interest in the environments, a sign taken by nurses as indicative of recovery. However, children became preoccupied with material things and did not appear to form close relationships with anyone. Protest and despair were absent in cases where the previous relationship with the mother had been severely impaired. Upon reunion, children who were protesting or despairing tended to react toward their mothers with overdependence and anger. In a few cases, children who were detached persisted in that mode; in other cases, detachment gave way rather abruptly to an anxious overdependence, the latter tending to characterize the mother-child relationship permanently.

Robertson and Bowlby theorized that enduring separation from an attachment figure after bond formation could not only heighten a young child's longing for the mother but also bring into prominence the ambivalent component of the relationship normally kept in check by positive interaction. When a young child was involuntarily separated, it was difficult for him or her to understand parental motivation and the temporary nature of the event. Hence, long separation was equivalent to a permanent loss endured by an adult. In a later study, Robertson and Robertson (1971) fostered young children during separation. They found that the children tended to show few lasting detrimental effects, although they clearly missed the mother, but the presence of responsive substitute care forestalled many of the negative reactions observed in the earlier Robertson and Bowlby study (1952). In a related vein, Rutter (1972) suggested that maternal deprivation and mother-child separation effects may be exacerbated by inconsistent or unstimulating substitute environments. Nonetheless, most workers in the field would agree that a continuous, focused relationship with a mother figure promotes optimal development in young children.

This section has contained a selected review of some environmental influences on the infant, starting prenatally and continuing into early childhood. Focusing on adversity, the studies jointly suggest that absence of appropriate early experience and/or the presence of inappropriate environmental experience during early life can have an effect which, if not permanent, is difficult to reverse later on.

In the prenatal period, chemical agents and perhaps even maternal emotionality are seen to affect the physical status of

the fetus and infant and, hence, potential for developing into a mentally healthy individual. In the postnatal period, the absence of appropriate stimulation most likely to be found in nature in the person of a mothering figure has been seen to have damaging effects, most clearly on normal emotional growth and, in some extreme cases, on cognition. Severance of a bond, once formed, is also considered to be a condition which may have adverse effects, ranging from heightened anxiety to more profound alterations in emotional capacity, depending on a number of factors, such as substitute-care conditions, the length of separation, and the age of the child.

Such conditions are relatively rare in natural environments and the majority of children are reared with adequate nurture. However, the damaging effects of inadequate caregiving are so striking that many researchers have turned to studies of the normal processes by which parents and infants come to form enduring bonds. From examples of absence, the importance of environmental elements, all too often taken for granted, is highlighted. Studies of pathology and the conditions productive of pathology lead one to ask about normality and conditions supportive of it. Hence, a first step in the prevention of mental illness and promotion of mental health is to try to understand the processes of normal development of relationships in infancy. The following section starts with a discussion of some parental (usually maternal) factors that have been shown to influence infant development and infant-caregiver interaction. It proceeds to review some factors that influence the budding relationship of parent to newborn, long before the infant can fully reciprocate in interaction. Then the course of normal development of infant-mother attachment follows.

The Infant-Caregiver Interaction

Parental influences on caregiver-infant interaction. As clinicians in therapeutic practice can attest, happy families (numerous exceptions notwithstanding) tend to perpetuate themselves; the converse is also true. Rutter and Madge (1976) have presented evidence of connections between rearing in unhappy or disruptive homes and later rates of illegitimate birth, teenage parenthood, unhappy marriages, and divorce. Among fathers and mothers reported to authorities for child abuse, a large proportion were themselves abused in early life (Spinetta and Rigler, 1972).

Among historical influences on infant-caregiver interaction, attitudes and specific child-care practices learned from one's

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culture are significant. General cultural attitudes toward the place of infancy in the lifespan can shape expectations of infant and child behavior and even define, in part, the shape of the caregiver-infant interaction. For instance, in Victorian England, at the turn of the century, many upper class mothers gave their children over to the care of a nanny, who provided the majority of affectionate and physical nurture, while the mother remained more distant.

Personality variables, however they come to be formed historically, are influential determinants of interaction with an infant. Such variables may determine parental ability to form and to maintain a consistent, loving relationship with a dependent. For instance, to the extent that a mother is preoccupied with her own problems, and to the extent that she must deal with unresolved crises in her own past, limits are placed on her ability to sustain appropriate nurturant care of a child. Delozier (1978) reported that threats of abandonment, parental suicide, or other separation from parents were frequently found in the life histories of mothers who abused their children, and these women as adults tended to be especially anxious about even very minor separations. Frommer and O'Shea (1973a,b) found that women with histories of disruptive care as children were later more likely to prop up their own very young babies for feeding and to become pregnant again during the year after delivery. Caldwell and her associates (Caldwell et al., 1963; Caldwell and Hersher, 1964) found a relationship between maternal personality as assessed during pregnancy and later form of child care. Mothers who shared infant care with one or more other mother figures were more hostile, dominant, and dependent than mothers who cared for their children exclusively. Moss et al. (1967) related assessments of maternal personality taken when women were newly wed to patterns of later infant care. Women who had reported warm, frequent interaction with their own mothers, who had accepted the feminine role, and who had described infants in terms of their personally rewarding aspects, tended to be more responsive to their own infants. After a baby is born, ongoing environmental events, not tied directly to the infant's characteristics, may affect the quality of the mother-infant interaction. Joyce Robertson (1965) found evidence that traumatic events which temporarily depressed two mothers affected responsiveness to their babies and modified their interaction in a way that did not change after the depression had lifted.

In practice, it is difficult to assign weights to the relative influences of a caregiver's own early history, later experience

(such as might occur in the hospital after the baby's birth), and ongoing experience with the infant in shaping the outcome of the interaction. Firstborns are more likely to have difficulties in social adjustment than laterborns (Mussen et al., 1963), but they are also over-represented among eminent individuals (Belmont and Marotta, 1973). Firstborn or only children are usually thought to experience both more anxious and more intensive interaction with their parents, but there is also evidence that hormonal metabolism differs between first and subsequent pregnancies (Gemzell, 1954). In a study of the mothering abilities of rhesus monkeys who as infants had themselves been deprived of mothering, Harlow and Suomi (1971) found that females so reared were abusive and/or rejecting of their first infants but also that some improved with second and subsequent infants. Among humans, there is some evidence that a mother's parenting skills improve with subsequent infants (Thoman et al., 1970).

Inasmuch as the individual's life experiences are expressed in well-consolidated structures of personality, these structures can be thought of as having considerable momentum in shaping infant-caregiver interaction. But insofar as they remain open to subsequent experience they may be changed to meet the demands of a particular infant. For those working in the field of infant mental health, these conclusions have clear implications. Attitudes and personality assessments during pregnancy may give valuable clues as to the probable course of a caregiver-infant interaction, but intervention will still have ameliorative effects to the extent that behavior remains open to modification, by whatever means, throughout the lifespan.

Ongoing maternal influences on infant development. Early research on infants in institutions highlighted the importance of normal maternal care in promoting a variety of social and cognitive competencies in the first 2 years of a child's life. Subsequent research has suggested that certain aspects of maternal care, such as variations in feeding methods (for a review, see Caldwell, 1964) or total amount of contact over a certain minimum (Blehar et al., 1979) do not have differential effects on infant behavior. More subtle maternal variables, such as affective tone, quality of stimulation, and contingency of responsiveness to infant signals appear to be more important determinants of infant development.

Physical contact that is tender and careful appears to have a beneficial effect on infant development and on the infant's attachment to the mother. In the early months, such contact is

most developmentally appropriate. Later, however, as the infant gains locomotor competence, frequent, prolonged handling may become too restrictive, and other modes of interaction may assume greater significance in stimulating development (Blehar et al., 1979). Verbal stimulation of infants by mothers has been related to greater infant cognitive ability, as measured by frequency of vocalization and language aptitude (e.g., Goldberg and Lewis, 1969; Kagan, 1971). Much eye-to-eye contact between infant and mother has also been related to a stronger or more secure tie to the mother and perhaps even to advanced social and cognitive development (e.g., Lewis and Goldberg, 1969; Moss and Robson, 1968; Blehar et al., 1977).

In infancy, the mother is not only a source of stimulation but a mediator of environmental stimulation. Mothers who provide their babies a wide variety and great number of play materials and activities and who allow relatively much unconfined floor freedom tend to have infants who are cognitively advanced (e.g., Rubenstein, 1967; Tulkin, 1970; Yarrow, 1963; Yarrow et al., 1975; Ainsworth and Bell, 1974). S. Bell (1970) found a relationship between the security of the infant's attachment to the mother (itself related to maternal sensitivity to signals) and the infant's advancement in the attainment of the important concept of a permanent object. A number of studies have found relationships between maternal appropriateness and immediacy of response to the infant and later infant development. For instance, Bell and Ainsworth (1974) found that contingent responsiveness to early infant crying, rather than reinforcing and hence augmenting crying, was associated with decreased crying and advanced noncry social communication in the fourth quarter of the first year of life.

Implicit in this general interest in maternal sensitivity to signals is the notion that prompt and contingent responses help the infant learn that the environment can be controlled and that his or her actions have consequences, hence establishing in the child a more general expectancy of mastery over and competence in dealing with the social and inanimate environments. Clarke-Stewart (1973) found clearcut relationships between children's competence and maternal care. In a study of first-born children observed during a period spanning 9 to 18 months of age, specific relations were found between child-language development and maternal-verbal stimulation, child skill with objects and maternal presentation of play materials, and maternal and child positive social behaviors toward each other.

Other relationships were found between maternal restrictiveness and child lack of involvement with objects, maternal effectiveness and child lack or irritability, and maternal cuddling and child physical attachment to the mother. Over time, a mother's stimulating and responsive behavior influenced the child's intellectual development, whereas in the area of social relations the child's behavior influenced the mother. In this vein, other studies (some mentioned earlier in the sections on neonatal abilities and individual differences) have documented variations in infant behavior and their sustained influence on caregiving styles. Robson (1967) found individual differences in characteristic seeking out or avoiding early eye-to-eye contact in infants as well as differences in quantity of eye-to-eye contact sought by mothers. Patterns established by 4 to 6 months predicted the quality of the infant's attachment to the mother. Moss (1967) suggested that maternal responsiveness is at first primarily under the control of the stimulus qualities of the infant but that gradually, if the mother is contingent in her responses, her efficacy in regulating infant behavior increases, and infant control likewise diminishes until a balance is reached. The studies of Ainsworth and her associates (Bell and Ainsworth, 1974; Blehar et al., 1979) suggest that maternal sensitivity to signals may be a more potent long-term shaper of infant-mother interaction than are infant characteristics observed in the first 3 months of life.

Social-class differences in mother-infant interaction. There is evidence suggesting that mother-infant interaction differs among social classes, and with implications for infant social and cognitive development. Moss and Jones (1977) found that pregnancy interviews predicted later maternal behavior more reliably for professional but not for working-class groups, indicating that professionals were either more articulate or actually had more control over the external environment. Kagan (1971) studied firstborn infants from working-class and middle-class families. At 4 months of age, there were no social-class differences in measures of attentiveness between working-class and middle-class groups, but such differences became significant at 1 year of age. During the third year of life, middle-class children had larger vocabularies and performed better on cognitive tests than did the working-class children. He interpreted these findings as reflecting the greater variety and environmental challenge to be found in middle-class homes. In another study (Tulkin, 1970; Kagan & Tulkin, 1971) mother-infant daughter interaction in dyads from middle- and lower-class homes was observed during verbal interaction and play. Middle-class mothers had more face-to-face contact with their children and vocalized more to

them. They encouraged and rewarded their daughters more for individual mastery. In a laboratory situation, middle-class girls were more likely to quiet dramatically in response to meaningful speech than were lower-class girls, and middle-class girls were also likely to quiet more in response to hearing the mother's voice. On cognitive tests at 13 and 27 months of age, the middle-class girls were precocious compared to the lower-class girls.

White and Watts (1973) studied the relationship between characteristics they labeled "competence" and the home environment. "Competent" children were defined as those who could engage the attention of adults in socially acceptable ways, use them as resources and who could express affection and hostility to peers, lead and compete with peers, and imitate adult rules. Competent children showed linguistic skill, pride in mastery, and sensitivity to discrepancy and inconsistency. Fourteen 1-year-olds and 17 2-year-olds were classified as competent or incompetent on the basis of the classification of older siblings. The overwhelming majority of competent children (21 of 22) came from white-collar homes, and six of nine of the incompetent children from blue-collar homes. Not one of the incompetent children was reared in a professional home. Competent children were more proficient on language tests and other tests of cognitive skill. Mothers of more competent children interacted verbally more with them and stimulated intellectual development and mastery more than did the mothers of the less competent children.

In summary, in the first years of life variations in maternal caregiving practices, both among mothers of similar social backgrounds and between groups from different social milieus, can influence child social, emotional, and cognitive development. The dimensions of maternal behavior that account for child differences seem to be more qualitative (contingency, appropriateness rather than quantitative or generic, e.g., amount of time spent in contact, type of feeding method). Relationships have been found between the quality of the infant-mother attachment and infant cognitive development and between specific maternal style of interaction (e.g., vocalization frequency, style of object play with infant) and infant behavior. Hence, in the first years of life, and especially in the first year, social and cognitive development appear to be closely linked to and strongly influenced by maternal care.

On the other hand, few studies have shown significant relationships between commonly used measures of infant intelligence, such as the Bayley Scales (Bayley, 1969) and child intel-

ligence. This may be due in part to the very heavy loading of infant instruments on motor measures, which do not generally relate to conceptual abilities commonly tapped by standard IQ tests. It is possible that infant "intelligence" is more susceptible to maternal shaping and influence before the infant gains sufficient independence to sustain solitary activity and while the mother remains chief mediator of environmental stimulation. Later on, intellectual and social competence may begin to diverge. Nonetheless, there are probably some significant continuities in environments provided infants and children, so that parents who are sensitive to infant signals provide stimulating and age-appropriate experiences for the older child. The issue of relationships among various facets of development beyond the first year remains an open one (some studies mentioned in the next section suggest that continuities do exist at least in the preschool years), but it seems clear that maternal style of interaction is of significant, ongoing, if not persistent, influence on social and cognitive development of the infant and very young child.

Parent-infant bonding in the newborn period. The love of parent for child, and the notion that a parent would naturally act in the child's best interest, has, until relatively recently, been taken as given in the American legal system. Despite highly publicized rising rates of infant abuse, neglect, and abandonment, such occurrences are often viewed as genuine and exceptional aberrations. Underlying assumptions, codified and folk, is the idea that the bond between parent and child is almost inevitable under normal circumstances. What are these normal circumstances?

Ethologists and students of naturally occurring behavior in nonhuman primates are wont to characterize environments in terms of how closely they approximate the probable environment in which the species evolved. How did mother relate to infant over the ages, and the dyad to the social group? While primate troops are still to be found relatively easily in the wild, simple and undisturbed small groups of humans are rarer. When they are found (e.g., Konner, 1972), it appears that normative behavior of a mother toward her infant involves more or less continuous close contact during earliest infancy, with ready access to the breast for nourishment and/or comfort. Later, when the infant is more mobile, there is frequent interaction with agemates and ready access to contact either from the mother or

from other adults and children in the group. Hence, prolonged physical intimacy within a small group is the rule.

Until relatively recently, childbirth was an event occurring in intimate familiar settings, followed by close contact between mother and newborn. The contact was sustained by the physical exigencies of breastfeeding, a practice that would continue for years until the child was weaned to an adult diet. In other mammals, and even in the primates, there is evidence that the hormonal changes of pregnancy, parturition, and lactation can prime the female to be highly responsive to infants, and there is no reason to doubt that similar effects occur in humans. With the advent of bottle-feeding, however, some of the beneficial hormonal effects of lactation may be lost. In an analysis of the composition of breast milk, Blurton-Jones (1972) suggested that it was so constituted as to suggest its adaptation to very frequent feedings such as might occur when an infant was in more or less continuous contact with the mother rather than to infrequent interval feedings, as commonly occur in Western households today.

The immediate demands of a particular infant aside, most mothers in less-developed environments would probably already have had extensive experience with other infants and young children and would continue to have the sustained support of group members. Dovetailed to these environmental dimensions would be the behavior of infants, which has already been considered and which has been shown to have a compelling quality for most adults in normal circumstances, even before a relationship has become personal and focused.

Modern Western societies can be construed as "violating" the above conditions in varying degrees. Many young men and women embark on parenthood without ever having cared for young children or held a baby. Their expectations of the "ideal baby" may clash greatly with the realities of their infant. Childbirth occurs in hospital environments, where the mother may not even be fully aware of the happenings of labor or birth, and where the father may be left waiting outside in a room. Infants may be separated from their mothers for hours or even days and, for the duration of the hospital stay, brought to them at scheduled intervals. Breastfeeding, no longer considered essential for the physical survival of infants, may be abandoned for bottle-feeding, which frees parents to go about other activities more readily. Once home, infants are "cached" in cribs, bassinets, playpens, and swings, in order to allow the parents to undertake domestic chores and leisure activities. Bottles can be given to a supine infant, and the need for contact during feeding

may thereby be eliminated by a busy mother. Parents may work away from the infant even from the early months, and substitute care may be custodial rather than personally nurturant. Infants and young children may have relatively little contact with agemates until school age. Close family members or other members of a tightly knit social group may be unavailable to assist the parents in time of need.

Although modern practices may be seen as "unnatural," in the sense of being dissimilar to practices commonly found in simpler human environments that approximate conditions under which the species evolved, they are not necessarily worse. Western societies have made and will continue to make adaptations to the demands of everyday living. Hospitals, having overcome a period of unpopularity owing to the causative role of certain practices in the dreaded childbirth fever, now save the lives of many infants and mothers. An idealization of more natural methods of childbirth and child care in the immediate postpartum period must be tempered by remembrances of high infant and maternal mortality. Physical strain is imposed on mothers by breastfeeding. Even in the Middle Ages, women of the upper classes seemed eager to find a wetnurse for their infants to be relieved of what they saw as a prolonged burden. (Breastfeeding was then a matter of years rather than months as is common when it is undertaken today.) The placing of infants in safe places may, among other things, prevent accidents that occurred when, in earlier times, a mother failed to maintain vigilance over an infant.

Nonetheless, obvious benefits of modern practices aside, they may have worked to make the establishment of an affectional tie between caregiver and infant more problematical and less automatic. While such impediments can most likely be overcome if other continuing circumstances are optimal, when environmental situations fall below standard and/or when the infant presents immediate physical or behavioral problems to the parent (as might occur when the baby is premature), then more "natural" practices might play an important sustaining role. Various movements in the United States today appear to be leading parents back to more immediate and intensive involvement with the processes of pregnancy, childbirth and child care, as the popularity of Lamaze classes, LeBoyer childbirth, immediate postpartum contact, father coaching in labor, and La Leche league groups attest. It is as if parents, taking as given the physical health of their offspring (made available in great part by general improvements in hygiene), are turning back to practices which may aid the psychological development of their

relationship to the infant while incurring no costs in terms of increased infant mortality.

Establishing the parent-infant relationship. Entwisle and Doering (Doering and Entwisle, 1977; Entwisle and Doering, 1979) studied couples during a first pregnancy, childbirth, and the early postpartum period. They viewed pregnancy as a crisis in the lives of the couple when they were called upon to modify their mutual roles and to accommodate to the demands of a third party. The emergence of the new family unit could be impeded by unpleasant conditions of labor and delivery, negative effects spilling over into husband-wife and parent-child relationships. Information and preparation were hypothesized to serve a function in mobilizing an appropriate response to crisis. Accordingly, the researchers found that the higher the level of preparation for childbirth (typically in the form of classes), the greater the degree of consciousness a woman experienced during her labor, and the more positive her evaluation of the birth experience. Likewise, participant husbands evaluated the birth more favorably. Although Entwisle and Doering did not conduct detailed observations of parent-child interaction, they did poll couples in the postpartum period and women 6 months after their infants' births. They found that women who had undergone much preparation breastfed their infants longer than women with little or no preparation. Women who breastfed, in turn, reported themselves as feeling like mothers earlier than women who did not. In a similar vein, husbands who were actively involved in the childbirth experience tended to be more involved in postpartum infant care.

While classes in childbirth preparation generally equip parents to handle relatively well the physical and emotional demands of labor and delivery, there is some indication (e.g., Doering and Entwisle, 1977) that expectant couples tend to resist receiving information about baby care, despite their inexperience with infants, and to focus rather on the birth experience. Such resistance may be unfortunate in light of other findings (e.g., Epstein, 1979) that pregnant teenage mothers hold inappropriate notions about the characteristics of infants, for example, that they require little more than physical care until about 1 year of age. Inappropriate expectations concerning infant development, capabilities, and needs may be implicated in child abuse (Steele and Pollock, 1968). An absence of knowledge about infant development can be overcome by actual experience, but there is reason to think that the initial process of bond forma-

tion between parent and infant may be facilitated by increasing parental competence prepartum. At present, there is widespread advocacy of child-development information programs, starting in high school and involving males as well as females. It is hoped that such programs will help new parents understand their own infant, appropriately interpret infant behaviors, and reduce the incidence of dysfunctional early interactions.

One of the goals of "natural childbirth," home birth, and hospital-practice reform movements is personalization of an experience that might otherwise frighten and bewilder couples not familiar with medical technology. Until rather recently, hospital practices have involved separation of mother and infant almost immediately after birth, reunion occurring only for brief, scheduled feedings at fixed intervals. Increasing interest in parent-infant contact has led to a relaxation of these standards, so that in many hospitals mothers are given their infants in the delivery room, even before the cord has been cut, and parent-infant contact continues relatively undisturbed, as when the infant "rooms in" with the mother. Fathers, and in some cases other members of the immediate family, are allowed ready access to the infant, rather than being permitted to view it only from behind a glass enclosure. Increased contact from rooming-in procedures as opposed to more routine nursery care of newborns has been shown, as assessed by a questionnaire before their discharge (Greenberg et al., 1973), to enhance mothers' judgments of their competence in infant care.

Perhaps the best-known study of the psychological effects on mothers of early extended contact with their newborns was done by Klaus and his associates (Klaus et al., 1972). Twenty-eight young first-time mothers of low socioeconomic status were assigned either to a "control group" or to an extended contact group. In the control group, mothers saw the infant briefly at birth and had brief contact 6 to 12 hours later. For the duration of their stay in the hospital, the baby was brought to them five times a day for 30-minute feedings. The extended-contact mothers held their naked babies for 1 hour within the first 3 hours after birth and were together with them for 5 hours on each of the following days. During a physical examination of the infants at 1 month of age, the mothers' behavior was observed. Extended-contact mothers stood closer to their babies, soothed them more, and engaged in more fondling and eye-to-eye contact with them. During a feeding session, extended-contact mothers fondled their babies more and held them more frequently in face-to-face positions than did the control mothers. Several other studies (reported in Klaus and

Kennell, 1976) have observed similar beneficial effects of extended contact. More recently, De Chateau (1979), in a study of Swedish mothers and infants, found that extended-contact babies were breast fed longer than control infants and were advanced in psychomotor development at 1 year of age and in language development at 3 years of age.

The interpretation Klaus and Kennell placed on these findings stresses both physiological and cultural factors. Physiologically, the mother may be primed to be especially responsive to skin contact with an infant in the immediate postpartum period, which may be a kind of "sensitive period" for the release of maternal feelings. While such contact is not essential for mother-infant attachment to emerge, it assumes greater importance in shaping the relationship in cultures, such as that in contemporary United States, where mothers and babies may be subject to many separations. Contact in the newborn period can be seen as an immunization against later stressful events that might otherwise threaten to deviate the attachment relationship from its optimal course. Early contact also provides a bridge between birth and the period of a mother's more specific attachment to an individual infant.

While the research of Klaus and his associates has been translated into practice in many American hospitals that now encourage early contact between mother and baby, questions have been raised about its generality. Could the results obtained have been due to the "demand characteristics" of the situation, so that extended-contact mothers felt that certain behaviors were expected of them and behaved in accordance with expectations? Might the beneficial effects of treatment be tied to the social class of the mothers? In studies noting similar effects and reported in the book, *Maternal Infant Bonding* (Klaus and Kennell, 1976), the populations receiving extended contact were deprived in the sense of being poor, young, and relatively uneducated. Some have speculated that in such groups special treatment by doctors and nurses may have elevated self-esteem and, hence, aided ability to parent but that similar treatment might not to do so in nondeprived populations.

Pannabecker and Emde (1977) have studied the effects of extended contact on the father-infant interaction, on the assumption that, if such contact is beneficial to the mother, it should likewise be beneficial to the father. In this study, fathers were recruited through prenatal classes, and all had healthy full-term newborns. During the first 3 days of the babies' lives and while the infants were still in the hospital, the fathers were assigned to three groups. In the first, fathers were given instructions regard-

ing the specific characteristics of their own infant, who was present. They were allowed to hold and to interact with the infant and to observe a Brazelton examination. A second group of fathers received the same general kind of instructions, but their own babies were not present, and they instead saw a film on typical newborn behavior. A third group received no instructions at all. During a 1-month baby check-up, fathers were observed with the infants. No consistent differences in behavior were observed among the three groups. In discussing their negative results, the researchers point out that all the fathers were from middle- or upper middle-class backgrounds and all had been able to hold their infants in the delivery room and throughout the hospital stay. Therefore, the study does not disprove the beneficial effect of early father involvement on the father-infant relationship. In this vein, recent evidence (Peterson, Mehl, and Lieberman, 1979) suggests that fathers' participation in their baby's birth and attitude toward the experience were the most important of several pre- and perinatal variables in predicting the nature of their attachment to the infant. But the Pannabecker and Emde study suggests that further contact with and instruction about their infants may not enhance attachment still more when fathers have been already highly involved in the birth experience.

Sander and his associates (1970) have noted the greater ease with which infants establish regulation of sleep and wakefulness patterns when they "room in" with their mothers in the hospital as compared with infants kept in nurseries where they are attended to by several nurses. Implicit in this concern for the early regulation of rhythms is the notion of infant-caregiver adaptation. If development is to proceed optimally, then the infant must come to be predictable to the mother, and the caregiving environment must achieve some structure for the baby. Being able to predict what the infant will do gives a new mother a sense of competence in her role. The question remains (as it does in all studies of the immediate effects of early experience) as to whether or not early relative asynchrony in nursery infants has any long-term negative effect, but it still is true that practices which lead to a satisfactory resolution of caregiving "issues" probably provide a basis for optimal processes of mother-infant and infant-mother attachment.

Summary. There is currently increased awareness of the importance of preparing parents psychologically as well as physically for the birth of their child. The arrival of an infant, especially a first one, requires numerous adjustments in relationships be-

tween the spouses and numerous adjustments to new roles as parents of a dependent and demanding child. With the increase in teenage pregnancy (which constitutes a high-risk pregnancy physically and emotionally), the need for early and appropriate education concerning the task of parenting becomes pressing. During the in-hospital period, immediately following the baby's birth, it likewise seems sensible to continue education, focusing on the specific characteristics of the infant (as they might be demonstrated during a Brazelton examination, for instance) as well as on more general infant care. During the first year of life and beyond, pediatricians may come to assume a more active role as parent educators in the psychological characteristics of infants, as well as continuing in their more traditional role as educators in physical care.

In the hospital, practices which promote psychological benefits without compromising infant health are becoming much more common. Infants, particularly those whose mothers have received little medication during labor and delivery, tend to be alert and more responsive for an hour or so after birth than for some time after. Their responsiveness, combined with the pleasure parents derive from bodily contact with them and the enhanced self-esteem experienced by interacting with one's own healthy newborn, may benefit parent-infant relationships in general and in particular in populations otherwise at high risk by virtue of age, education, socioeconomic level, marital status, or parity. In this vein, O'Connor (1977) reports lower rates of child abuse, neglect, and abandonment in that segment of a high-risk population in which mothers had had extended in-hospital contact with their newborns. Others (e.g., Leiderman, 1969), working with a physically high-risk population of premature infants, have noted difficulties in parent-infant attachment and have stressed the beneficial effects of parental handling and nurturing of such infants, even while they are still in isolettes in intensive-care units. It should be noted that a revolution is under way in the psychological care of premature infants and their parents. This change is based in part on a recognition of the importance of promoting early personal contact with their babies in order to increase the parents' feelings of competence with and affection toward the child.

Early contact may be seen as one element influencing the parent-infant relationship, other elements being the parents' own childhood histories and immediate interaction with and feedback from a specific infant. Especially when the parental history has been unfavorable, in terms of absence of adequate nurture, and/or where the present environmental milieu lacks

important supports, extended contact in the early postpartum period may serve a valuable function in promoting the mental health of parent and infant.

The Development of the Infant's Attachment to a Caregiver

General. Some factors which are thought to influence the parent's attachment to the infant before the infant can be said to have established a reciprocal relationship (in the sense of focusing on a single, permanent, and separate other) have been examined, and some evidence has been found for the enduring influence of parental personality on responsiveness to the infant. In this section, the development of the infant's relationship to a figure is described, first normatively, and then with an eye to individual differences in quality of the bond. Throughout the first year of life, infants gradually become attached, and several phases in this process have been distinguished. Typically, attachments are formed to mother and father and to any other figures who spend relatively much time in affectionate interaction with the baby. Theorists, working from different perspectives, notably psychoanalytic (e.g., Mahler et al., 1975), learning (e.g., Gewirtz, 1972), and ethological (e.g., Bowlby, 1969), have viewed the processes of infant-caregiver attachment in somewhat different ways. In this section, little attention is devoted to such differences, emphasis being placed instead on points of consensus and primarily on empirical findings.

Until relatively recently, most work on attachment has dwelt on the infant-mother relationship, on the assumption that the child's mother was the primary source of nurture. The father-infant relationship, if studied at all, was relegated to a very subsidiary role. Recent evidence suggests that the father too functions as an important attachment figure for most home-reared infants, and current research in this area is increasing. (For an up-to-date summary of some findings, see Lamb, 1976a.) Unlike research on the infant-mother relationship, studies of the father-infant relationship have, with few exceptions (e.g., Lamb, 1978), tended to deal with normative behavior rather than with individual differences in dyadic interaction.

The following account of infant-caregiver attachment is meant to orient the reader to some studies which serve as examples of basic work with practical mental health applications. It is not meant to reflect evenly the contributions made to the field of attachment research or to be a review of various positions taken.

Phases in the development of attachment. According to Bowlby (1969), three phases in the development of infant-caregiver attachment in the first year of life can be distinguished. They are:

- *Undiscriminating social responsiveness.* Approximately the first 2 to 3 months of life. The infant orients to salient environmental features, most likely to be coming from caregivers, and possesses a repertoire of behaviors that bring caregivers into proximity, contact, and interaction.

- *Discriminating social responsiveness.* Approximately 3 to 6 months. The infant continues to be generally responsive to social stimulation but now discriminates between familiar and unfamiliar figures by differential smiling, vocalization, crying, and greeting. This phase ends with the emergence of active proximity-promoting behaviors, so that the infant can follow attachment figures.

- *Active initiative in seeking proximity/contact.* The baby shows strikingly increased initiative in promoting contact and proximity. Signals have the intent of evoking a response from a caregiver, and locomotion facilitates proximity-seeking. This phase coincides with Piaget's sensorimotor stage in which the child first begins to search for hidden objects and begins to perceive the object as permanent.

A number of empirical studies of the normal development of attachment in family-reared infants in the United States, Western Europe, and Africa (e.g., Schaffer and Emerson, 1964; Ainsworth, 1967; Ainsworth et al., 1972; Ainsworth et al., 1978; Yarrow, 1967) have confirmed the occurrence of these three phases, this despite differences in samples, methods, and criteria of attachment.

The beginnings of sociability. In the first 2 or 3 months of life, infants and caregivers have few channels of social communication open to them. They may interact in the course of holding or they may interact face to face. What goes on during physical contact in the early period has been little studied, perhaps because it is difficult to detect subtle responses from infants. More research has been done on face-to-face situations.

While the capacity for prolonged mutual gazing is not fully developed until around 6 weeks of age, even in the newborn period sporadic instances of focused eye contact are to be observed. As noted previously, eye contact has a thrilling effect on the caregiver, who is likely to interpret it as a sign that the infant is becoming truly social and discriminating. Brazelton and his colleagues (Brazelton et al., 1974, 1978) and Stern (1971, 1974) have studied early face-to-face interaction between infants and their caregivers. Around 3 months of age, infants are typically greeted "en face" by adults who assume exaggerated facial expressions and who speak to the babies in slowed-down speech in which the pitch has been raised. (Such interaction is apparently peculiar to infants and pets.) Face-to-face interaction has a pattern, consisting of a period of mutual engagement with high-intensity behaviors and a period of resolution when one or both partners break off interaction. When the interaction is pleasant to infants, they "cycle" their bodies rhythmically in response to adult behaviors, thus giving the appearance of wholehearted attention to the situation.

Likewise, disturbed interactions are frequently characterized by gaze aversion and maternal overstimulation (e.g., Stern, 1971; Brazelton et al., 1974; Trevarthen, 1974). Gaze aversion in infants has been noted as early as 2 weeks of age and, in face-to-face interaction, it is hypothesized (Stern, 1974) to serve a function of arousal reduction when stimulation becomes too intense or too unpleasant. In a study of a mother with twins, Stern (1971) found striking differences in interaction style. With one twin, interaction was smooth and harmonious. With the other, interaction was marred by infant crying and turning away from an overstimulating mother.

Blehar et al. (1977) noted early individual differences in quality of mother-infant face-to-face interaction in a period between 6 and 14 weeks of life. The mother's style and appropriateness of intervention was correlated with the infant's degree of responsiveness. They also found that infants who had more positive experiences of face-to-face interaction with their own mothers discriminated between mother and a home observer whereas infants with less positive experiences did not. Finally, early face-to-face interaction patterns were related to the quality of attachment observed when the infants were approximately 1 year of age. Infants with secure attachments to their mothers had early pleasurable interactions, while babies who were anxiously attached had less harmonious early face-to-face experiences.

Eye contact is one of the most powerful and compelling forms of social communication available to humans. Typically,

prolonged gaze at close range is reserved for intimates; otherwise it is perceived by the recipient as threatening and hostile. Along with physical contact, eye contact at close range is one of the earliest forms of social communication that caregiver and infant have at their disposal; but unlike physical contact, eye contact—albeit at increased distances—continues to be a common form of social communication into the adult period of life. Early patterns of initiating, maintaining, and ending eye-to-eye contact may have a persistent influence on the quality of later interactions.

Focusing on a figure: Patterns of attachment. Ainsworth's program of research on qualitiative differences in patterns of attachment behavior is perhaps best known in the field. She and her associates (Ainsworth et al., 1978) conducted a longitudinal study of infants and mothers including home observations at repeated intervals throughout the first year of a baby's life and a laboratory assessment of attachment at approximately 52 weeks of age. The laboratory situation, called the "strange situation" (or variations on it), is widely used today in normative and individual-difference studies of infant behavior. The original situation consisted of a series of separations from the mother, followed by reunions. The separations heighten attachment behavior and thus allow for clear observation of individual differences in patterns of attachment during reunions. On the basis of strange-situation observations, Ainsworth and her colleagues categorized babies into three groups, A, B, and C.

Group B was the largest and normative group. They behaved as follows: When they were alone with their mothers, they explored actively, showing very little attachment behavior. Almost all were upset in the separation episodes, and all responded strongly to the mother's return in the reunion episodes, the majority seeking close bodily contact with her.

Group C was the smallest group. They were anxious even in preseparation episodes and were very upset by separations. In reunion episodes, they wanted close bodily contact with their mothers, but also resisted contact and interaction with them.

Finally, Group A babies showed little or no distress in the separation episodes and, most important, avoided contact, proximity, or even interaction with the mother in the reunion episodes. Some steadfastly ignored the mother, refusing to approach or even look when she coaxed them to come. Others mingled attachment behavior with avoidance.

In an early analysis of the three patterns of behavior, Stayton and Ainsworth (1973) identified two dimensions that related home and strange-situation behavior of the babies. The first factor they labeled "security versus anxiety." At home, Group B infants showed less anxiety over everyday separations, cried less in general, and were more likely to greet their mothers positively after an absence. They were also more content after having been released from physical contact. On a second factor having to do with close bodily contact, Group B infants responded more positively to being held, were more easily soothed by contact, more often initiated being picked up, and less often sought to be put down. Infants in Groups A and C defined the opposite roles on both dimensions. The mothers of Group B infants, more frequently than mothers of Group A and C infants, displayed behaviors reflecting sensitivity to their infants' signals and responded positively to them in the context of close bodily contact. Main (1979), in an analysis of Groups A and C infants, noted differences between them. Group A babies less frequently than Group C babies sank into their mothers when held and were more often angry than C babies (although both groups were significantly more angry than B babies). Mothers of Group A babies displayed a rejection of close bodily contact, expressed by having an aversion to it, and were relatively unexpressive and compulsive. Group C mothers were a diverse group, but not all were rejecting. They seemed to enjoy close bodily contact, but were highly insensitive.

Main (1977, 1979) interpreted these differences as follows. The conflict over close bodily contact of the C babies is one of wanting it and being angry because they do not get it or at least not as much as they desire. They lack confidence in the mother's responsiveness. When attachment behaviors are heightened, as in a strange situation, the babies are more upset than might otherwise be expected, because they have learned to be frustrated rather than comforted. The conflict of A babies is more complex. They have come to avoid close contact with their mothers because of rebuffs. Theirs is a classic approach-avoidance conflict, especially highlighted by the strange situation. To avoid the mother, perhaps not even looking at her, defuses the intensity of the conflict and averts an expected rebuff. At the same time, they are able to remain in some proximity to the mother and still benefit from the protection that even a rebuffing mother would provide should danger threaten.

Ainsworth (1979a, b) notes that the way a baby organizes behavior to the mother in a laboratory situation would be of little import, were it not for the fact that it apparently reflects more

general organization of attachment across a variety of situations. Ainsworth et al. (1978) found clear evidence that patterns of strange-situation behavior are linked to behavior manifested at home. S. Bell (1979) found that strange-situation behavior shown by disadvantaged black infants was significantly related to affect displayed by infant and mother in a free-play situation. Rosenberg (1975) found that infants in dyads showing much mutual ignoring in a free-play session had been judged anxious and avoidant in the strange situation, whereas mutually attentive dyads had been judged securely attached. There is also evidence that configurations of attachment behavior have stability over time (e.g., Waters, 1978).

Another group of studies has compared strange-situation patterns in 1-year-olds with patterns of behavior in other situations months or even years later. In general, these studies show continuities over time in the way a baby has organized attachment to the mother. Bell's infants (1979) and their mothers continued to display positive affect in interaction with each other throughout the second and third years, whereas anxiously attached infants also showed continuity of negative affect. Main (1973; Main and Louderville, 1979) found that at 22 months securely attached infants had become cooperative toddlers, both with mother and an adult playmate in a laboratory play session and with the examiner in a Bayley test. Matas et al. (1978) observed 2-year-olds with their mothers in a problem-solving situation. Those who sought their mothers' help with a problem that they otherwise could not have solved had been judged, 6 months earlier, to be securely attached.

Other studies have related quality of infant-mother attachment to later child competence and social behavior with others. Gove et al. (1979) observed Matas' sample at 5 years of age and found that those who had been judged secure as 1-year-olds were more ego-resilient as kindergartners and more able to adapt resourcefully to changing personal and environmental circumstances than were other children. Waters et al. (1979) classified children of W. Bronson's sample as securely or anxiously attached on the basis of their strange-situation behavior at 15 months and found that such assessments were related to Q-sort analyses of interpersonal and personal competence in a nursery-school peer group at 3.5 years of age. The securely attached children had become more self-directed, curious, and sought out by other children, less withdrawn, more likely to be leaders, and more sympathetic to the distress of peers.

Hence, there is a considerable body of evidence to support the notion that the organization of attachment to a mother figure

in the first year of life relates to social/emotional behavior at least up to 5 years, and this in a sample of "normal" children. The continuities to be found are continuities across developmental transformations in the way that behavior is organized rather than continuities of discrete behaviors. The strange-situation procedure, if validated more, may serve a function as a "marker" instrument for the source of social development.

Mother, father, and others as attachment figures: A hierarchy or co-equals? In a 1958 paper, Bowlby proposed that children are biased to become attached especially to one figure, typically the mother. Such emphasis on the mother has been questioned by other researchers who believe that the role of the father as an attachment figure has been neglected. A number of studies of infants in the "strange-situation" (or modifications of it) have demonstrated that mother and father are more or less interchangeable (e.g., Kotelchuck, 1972; Lamb, 1978). However, Bowlby also argued that when a child is tired, ill, or distressed he or she tends, if a choice exists, to seek out a principal attachment figure rather than secondary figures.

In the home, a number of researchers have found little or no difference in response to mother and other attachment figures (e.g., Ainsworth, 1967; Clarke-Stewart, 1978). On the other hand, Lamb (e.g., 1976b, 1977) found that when infants are upset they go to the mother rather than the father when both are available. Freud (1938) claimed that the infant-mother relationship was not only the most important "object relation" but also a prototype for subsequent love relations. However, there is evidence that qualitatively different attachment relationships can co-exist. Lamb (1977) and Main and Weston (1979) have used the "strange-situation" with the mother and the father. Neither found a relationship between patterns of behavior displayed with the two figures. Hence, a baby securely attached to the mother was equally likely to be securely or anxiously attached to the father. On the other hand, in the study by Main and Weston, several infants found anxiously attached to the mother but securely attached to the father were nonetheless unusually upset at the father's leavetaking. The researchers interpret these findings as evidence for an "effect of a relationship upon a relationship." Using play-session data, Main and Weston also found actual evidence of disturbance (e.g., stereotypes, inappropriate affect, and "odd" behavior) in almost every baby judged to be anxiously attached to or avoidant with both par-

ents but none in babies securely attached to just one parent, mother or father. Main et al. (1979), studying precursors of empathic reactions, have found that infants securely attached to both parents responded with attention to the crying of an adult actor, whereas not one infant judged avoidant of both parents did so.

Ainsworth (1979b) notes a dearth of research into the role of other adults as possible attachment figures, this despite the increasing use of substitute caregivers for infants in our society. She notes only five studies as relevant, one a comparison of mother and kibbutz metapelet in a strange situation, in which Fox (1977) found that both figures were more or less interchangeable. In another study (Fleener, 1973), infants received intensive care from a substitute caregiver for several successive days. At the end of this time, infants appeared attached to their caregivers as opposed to an unfamiliar person, but when responses to mother and experimental caregiver were compared, the former was clearly preferred. Other studies seem to indicate that substitute caregivers, while serving as attachment figures, are subsidiary to the mother (e.g., Ricciuti, 1974; Farran and Ramey, 1977; Cummings, 1979).

Some efforts have been directed at assessments of the effects of various forms of substitute care on the infant's attachment to the mother (e.g., Caldwell et al, 1970; Blehar, 1974; Hock, 1976; also see a review by Belsky and Steinberg, 1978). In light of the increasing use of substitute care, especially from the early weeks and months of an infant's life, more research into the effects of such care both on the infant and on the parents' attachment to the infant is needed. The work of Main and her associates suggests that a harmonious relationship with one figure can buffer an infant against the negative effects of a disruptive one. More research into this area is required.

Attachment and other behavioral systems. Bretherton and Ainsworth (1974) have viewed attachment as working in a dynamic interplay with three other behavioral systems: affiliation, fear-wariness, and exploration. Affiliation and exploration entice the infant to approach a stranger or a novel environment and to learn from experience; fear-wariness prompts the infant to escape a situation that is too novel, complex or threatening. In the normal course of caregiver-infant interaction, the infant can be observed moving away and then re-

turning occasionally to the caregiver for comfort or interaction. Self-initiated movements away from an attachment figure are much less likely to be associated with infant distress than separations initiated by the mother (Rheingold and Eckerman, 1973). Ainsworth et al. (1971) have found relationships between the quality of the infant-mother attachment and the infant's ability to use the mother as a "secure base" from which to explore the home environment. In the home, securely attached infants tended to show more exploratory behavior than anxiously attached infants, who were unsure of the mother's accessibility should they need her. The researchers make the point that accessibility can be psychological and can be translated into sensitivity to signals, immediacy, and appropriateness of responses. While it is apparent that the infant who is seeking proximity and contact with a figure is usually not simultaneously exploring, Ainsworth (1973) has asserted that the development of a secure attachment promotes rather than hinders the development of exploratory competence.

The relationship between fear of strangers and the quality of the infant's attachment to a figure is not a clear one. There is some evidence (e.g., Freedman, 1965; Bronson, 1972) that, within normal samples of infants, fear responses to strangers may have constitutional determinants. On the other hand, Main's work (1973) has demonstrated that securely attached infants tend to be more cooperative in interactions with others. Work on children in exceptional circumstances (such as those undergoing separation or maternal deprivation in institutional environments) suggests that extreme fear of strangers or indiscriminate and age-inappropriate friendliness may be related to disturbances in primary relationships (e.g., Robertson and Bowlby, 1952; Spitz, 1945; Tizard and Tizard, 1971).

It should also be noted that fears have a developmental course in the first year of life. Newborns show few reactions that could be characterized as fearful. Later on, in the second, third, and even fourth months of life, they persist in being friendly to most adults, familiar or stranger. Indeed, Rheingold and Eckerman (1973) challenge the notion that older infants are predominantly fearful in their responses to strangers. Others (e.g., Spitz, 1965) have used fear of strangers as a "developmental organizer" equated with fear of losing the mother and implying important cognitive developments. Bowlby (1969), while noting that not every infant shows fear of strangers, has suggested that its emergence may mark the beginning of the end of a sensitive period for the development of attachment. Once the infant has focused on one or a few figures, they will be

sought for comfort and protection. Being at the same time threatening and enticing, unfamiliar persons and environments are not as readily accepted. In this vein, it is interesting to note that infants do not show fear of heights until they reach the age at which they are competent to move about (Yonas and Hruska, 1971). Hence, a chronological change from impulsiveness to wariness may have general survival value.

In summary, while the primary focus of this section has been on infant-caregiver interactions, it is important to understand that that interaction, and the permanent relationship implied by it, have consequences for other important aspects of the infant's development (for a summary of some research on fears in infancy, the reader is referred to Lewis and Rosenblum. 1974). Hence, the quality of interpersonal relationships with significant others affects the balance the infant can achieve between seeking proximity to an attachment figure, affiliating with others, and exploring the inanimate environment.

The next section of the monograph will deal with issues involved in the definition and identification of infants who are at risk for development because of inadequate and unsupportive relationshps with primary figures, and with some questions involved in early prevention and intervention efforts.

THE INFANT AT RISK

What Are the Risks for Development?

The concept of the infant at risk is a key one for mental health. If it were possible to identify very early in life those infants who, lacking appropriate intervention, would develop abnormally, then the task of clinicians would be greatly simplified. However, no single index of risk is sufficiently indicative of later outcome to be useful for making accurate prediction about a specific case. Rather, a multiple and cumulative aproach may be a more informative one.

While for purposes of discussion risk for development can be separated into two components, in actuality, the two often occur together. The first component is birth risk, imposed by the physical condition of the infant and translated into such specific conditions as prematurity, postmaturity, small size for gestational age, illness during the neonatal period, etc. The second component is sociocultural risk, derived from such conditions as the mother's age, education of the parent(s), their social status in the community, income level, and more subtle factors in-

volved in parental personality composition and affecting ability to nurture another.

Birth risk. The term "continuum of reproductive casualty" was used by Pasamanick and Knobloch (1961) to describe birth outcomes thought to lead to severe disabilities, such as cerebral palsy and mental retardation. Early researchers in birth risk adhered to a linear model in which there was thought to exist a direct link between perinatal trauma and developmental disadvantage. However, more recent evidence (reviewed by Sameroff and Chandler, 1975) indicates that this model is oversimplified; while physical events surrounding birth are initially traumatic and may have short-term effects, their long-term effects appear to be either maximized or minimized by postnatal environmental factors. Medical risk, except in cases where the newborn shows gross evidence of impairment or massive trauma, suggests an increased probability of adverse outcomes, but it is by no means infallible (Parmalee et al., 1976).

To give some examples, anoxia, or oxygen deprivation during the birth process, has been implicated in minimal brain damage leading to learning disabilities, but the evidence culled from several studies has not demonstrated such effects conclusively (Sameroff and Chandler, 1975). There is evidence for a more difficult course of emotional adjustment in children who suffered perinatal asphyxiation (Stevenson, 1948; Corah et al., 1965). Prematurity and low-birth weight for gestational age have received much recent attention as indicators of risk for development. The preterm infant may be of correct weight for gestational age but born before term (usually defined as before 37 weeks postmenstrual age). Prematures may also suffer from a variety of difficulties because of the immaturity of their bodily systems and may require mechanical ventilation to sustain respiration until their lungs mature. Full-term infants may be small for their age ("small" usually defined as weighing less than 5.5 pounds), and such a condition is thought to indicate an adverse intrauterine environment. Some infants may be exceptionally large for gestational age (as frequently occurs when the mother has diabetes), and others may exhibit the postmaturity syndrome, defined as gestation beyond 42 weeks postmenstrual age, with wizened appearance suggestive of bodily depletion and probably resulting from late-pregnancy deficiencies in an aging placenta.

The risks which such conditions impose on infants is a subject of debate. Until relatively recently, little attention has been paid to the postmature infant, who often requires no immediate medical attention, while infants premature and those small for gestational age have been lumped together as at risk. There is some controversy as to which aspect of prematurity constitutes a risk for development. Prematurity is often accompanied by illnesses, deficiencies in bodily functioning, low weight, and isolation from parents in intensive care for weeks or months; and these factors, singly or in combination, may lead to later developmental problems. Low-birth-weight infants are frequently premature, but when they are full term, they may be at even higher risk than prematures, whose condition may be relatively uncomplicated otherwise and who are of appropriate size for age. There is little doubt that, as a group, infants of low-birth weight and those who are premature are more likely to suffer illnesses and have increased rates of mortality during the neonatal period than full-term infants and those of appropriate birth weight. Likewise there is some evidence that, as a group, prematures are at risk for subsequent neurological dysfunctioning and intellectual disabilities; the more premature the infant the greater the risk (Drillien, 1972; Francis-Williams and Davies, 1974; Lubchenco et al., 1974). Small-for-date infants, whether premature or full term, also show deficits during the neonatal period (e.g., Brazelton, 1973), and at school age they have lower intelligence scores on standardized tests (Weiner, 1970), special educational needs (Rubin et al., 1973), and poorer intellectual functioning (Fitzhardinge and Steven, 1972). Infants who exhibit the postmaturity syndrome have been variously reported to be con parable to normal full terms, or to have delayed social development (Lovell, 1973), illness and sleep disturbances (Zwerdling, 1967), reading disabilities (Butler and Alberman, 1969), and cerebral palsy (Drillien, 1968). Field and her associates classified postmatures as at risk because of their poor performances on the Brazelton neonatal assessment, and she has shown deficiencies in their functioning in the first year of life as compared with normal full terms (Field et al., 1978). Others (e.g., Parke and Collmer, 1975) have noted that premature and low-birth-weight infants are overrepresented among samples of abused children. It is hypothesized that the physical characteristics of such infants, such as hypo- or hypertonicity, unusual and compelling cries, and unattractive physical appearance, as well as the emotional separation parents may experience from them while they are in intensive care, may make the normal

processes of bonding more difficult, hence increasing the incidence of anomalies in parent-child relationships.

It is important to note, however, that, when evidence for long-term effects of physical birth conditions is sought, there is a clear interaction between physical factors and environmental features (Birch, 1971; Drillien, 1970). For instance, Werner et al. (1971) found that infants with a large number of prenatal complications were 5 points lower in intelligence scores than other infants when the socioeconomic level of the family was high. In very low socioeconomic environments the IQ differences between high- and low-risk infants was on the order of 25 to 30 points. Viewed prospectively, the medical risk of an infant appears to be less consequential in determining later developmental outcome than are environmental factors. In this vein, Greenberg (1971) has suggested that prematures and other infants who have suffered trauma at birth may be less able to compensate for depriving environments than healthy infants. But whether or not risk actually materializes appears to depend more on the social and educational background of the parents, particularly the mother, than on any single physical condition, gross and unusual impairments excepted. Biological high risk is magnified by inadequate environments and minimized by supportive ones. (For an orientation to some current research on infants at risk, see Field et al., 1979.)

Environmental risk. Among environmental-risk factors being given increased current attention is that of teenage childbearing. Teenage pregnancies are most likely to be correlated with other circumstances unfavorable to optimal infant development, such as inadequate maternal prenatal diet and obstetric care, single parenthood, relatively low-educational level, and poverty. While the birth rate for women over age 20 has been declining in recent years, and the birth rate among 14- to 18-year-olds has remained constant, the birth rate has actually increased for mothers under age 14. More and more, young women are choosing to keep their babies rather than to have abortions or give them up for adoption. In many instances, pregnancy and motherhood involve interruption of education and severance of social ties. Teenage mothers, being undereducated, are often unable to support themselves and their infants, and many find themselves in adult nurturant roles which they are unable to fulfill because of their own unmet needs for nurturance from parental figures.

Mothers under age 20 tend to experience more complications of pregnancy and delivery than older mothers, with consequently higher rates of premature and other infants of high medical risk than older mothers. Evidence suggests that these complications are due in large part to inadequate prenatal care rather than to intrinsic immaturity of the reproductive system. Whatever specific etiological factors are operative, infants of very young mothers appear to be at greater risk for cognitive and emotional deficits than are infants of older mothers.

Another group of infants at sociocultural risk are those born into economically and educationally disadvantaged families. Such infants may be more exposed to physical environmental hazards, including inadequate diet, lead poisoning, and other household hazards. They may lack consistent caregiving, and the social environment of their homes may be either so chaotic and unstructured or so unstimulating as to impede ready assimilation, so in either case cognitive development lags.

Likewise, in families where patterns of care are unstable and erratic, regardless of socioeconomic status, infants are more likely to show developmental disorders than are infants in families where care is stable. In this group can be included families where one or both parents suffer from major psychological disorders, or where either parent has experienced grossly inadequate care as a child and hence has impaired ability to nurture a dependent. Because of greater economic difficulties and the concomitant emotional toll exacted, one-parent families, especially when the head of the household is a young, undereducated mother with no marketable skills, may be at higher risk for producing infants with developmental deficits or delays. It must be stated clearly that not all parents who have had unfavorable childhoods or who live in unfavorable environments provide inadequate care. Most do not do so, but a significant if small proportion prove to have difficulties in coping with the parental role.

Hence, an approach to the identification of risk for development starts with demographic data—that is, identification of populations in which children are more likely to develop problems. Within such populations, an attempt is made to discover the epidemiological correlates of disorders, with an eye to defining significant causative factors, usually multiple in nature. Prevention efforts can proceed on many levels and can involve parent education while mothers and fathers are as yet in the school system, provision of adequate physical prenatal care and counselling concerning the role of parenthood, and revision of in-hospital practices during the birth so that parent-infant bond-

ing can be optimally supported. In the neonatal nursery, identification of infants who present risk for development can be undertaken, with the assumption that those who also are at risk because of sociocultural factors may be the most in need of intervention. Interventions can start shortly after birth and can involve clinical assistance meant to stave off maladaptive patterns of development, or else interventions can be initiated when an infant and mother present with incipient problems that, if left unchecked, are likely to proceed into more serious, enduring disorders. Since at the present time primary prevention on a population level is still a new concept and early clinical intervention programs are few and frequently difficult to compare because of population and procedural differences, it is impossible to judge the relative merits and efficacy of various approaches. It seems likely that a multilevel approach would be most effective, as at every stage of intervention, certain individuals would be helped and thereby not be in need of the more specific (and expensive) types of intervention and ultimately treatment, both of which require a high degree of clinical skill.

A data bank, containing information about the course of development of infants and young children, starting with information about birth events and continuing through childhood and into young adulthood when the infants themselves become parents, might provide useful answers to questions about factors conducive to mental health and mental illness. Such a data bank proposed in *Behavior Today* (June 2, 1977) by Zill and Brim would involve longitudinal observation on children, and because of its prospective nature, it would help place relative emphasis on one or the other factor as causative of a particular disorder. Such information would also help decision-makers weigh the relative cost-effectiveness of various types of proposed and ongoing interventions for specific populations.

Clinical Interventions

A 1979 report of the National Institute of Mental Health, *Clinical Infant Intervention Research Programs*, contained a review of 24 infant-intervention programs designed either to prevent or to correct a variety of emotional and cognitive deficits in infants and young children. Our purpose here is not to cover material found in that publication but to highlight some issues in clinical intervention raised therein.

Getting to high-risk populations. For purposes of intervention/prevention with families in greatest need, various approaches can be taken to identification, depending upon a program's specific goals. For instance, infants with biological complications can be identified and followed throughout the first year of life. If the infant begins to show signs of abnormal development, then a specific therapeutic intervention can be started or preventive intervention can aim at forestalling adverse patterns. A program can concentrate on families where, because of problems with previous children, parents have already come to the attention of social-welfare authorities. Still another approach involves operation in a setting where high-risk infants are most likely to be found.

Often, finding families in need of assistance on behalf of their infants is a matter of getting referrals from a number of sources, hospitals, public-welfare agencies, physicians among them. The referral may come only after infants start showing clear-cut signs of deviant development. Fraiberg's clinical intervention program (Fraiberg et al., 1975; Shapiro et al., 1976), which focuses on social and emotional development, depends upon such a system of referral. A program at the Mental Health Study Center in Adelphi, Maryland, also depends upon referrals from county agencies. The latter program is targeted at multiproblem infants, where numerous factors, maternal and infant, as well as socioeconomic conditions, provide a strong indication of risk.

A major problem confronting those who would intervene is reaching families in need and getting their cooperation. Frequently the people who have the most severe problems are also the most reluctant to participate in efforts to help their infants. The parents, for instance, may be having difficulties with their infants because of distortions in perception or deficiencies in their capacity to nurture. They can see little need for helping the infant if their own needs are unmet or if they fail to recognize the baby's plight accurately. In such cases, programs can focus on the parents' needs and emotional problems as well as on those of the infant. The parent(s) must be made to feel that the clinician is concerned about them as well as about the baby.

Some families harbor a general suspicion of official organizations, which they see as trying to invade their privacy or from which they fear stigmatization. Getting the participation of difficult-to-reach groups can be a task requiring persistence and great empathy—even in the face of broken appointments and doors which are unanswered when noise inside indicates that people are at home.

Assessment. Those interested in testing the efficacy of early clinical interventions have adopted a variety of strategies for assessment, often varying from program to program because of differences in stated goals (e.g., cognitive versus emotional enrichment) and because of differences in the theoretical orientations of practitioners. In general, there is a relative abundance of instruments to measure cognitive development and a relative dearth of instruments with demonstrated research validity to measure infant social and emotional functioning and the quality of the infant-parent relationship.

Prenatal assessments include an evaluation of such factors as the mother's diet and obstetric care, her age, parity and marital status, and possibly her perception of infants in general. Postnatal assessments of the infant include such data as the results of the Brazelton test (already discussed) and the mother's evaluation of newborn. In this vein, Broussard and Hartner (1971) developed an inventory concerning mothers' perceptions of their infant relative to other infants. Perception of the infant in immediate postpartum period was not related to problems in infant behavior at 1 month, but maternal perception at 1 month was related to such problems. The Schaefer Postnatal Research Inventory (Schaefer and Manheimer, 1960) was also used by Broussard and Hartner to evaluate aspects of maternal personality such as depression, negative aspects of childrearing, irritability, need for reassurance, fear or concern for the baby, and psychosomatic anxiety symptoms. Both a mother's perception of the infant and her rating on the Schaefer Inventory were related to the need for therapeutic intervention with the child at 4 years of age. Mothers who were consistently negative at time 1 and time 2 were most likely to have children needing therapeutic intervention. Of infants not viewed as better than the average baby either at time 1 or time 2, only 33 percent were classified as not needing intervention at age 4. There are perhaps more standardized assessments of infant than maternal functioning, but these are not without problems.

Intellectual assessments of infants by necessity rely heavily on easily observable sensorimotor functions, which do not relate strongly to later analytical and verbal functions measured on standardized child and adult intelligence tests. Cognitive testing in infancy can give some idea of where the infant stands relative to other babies at the time, but infant tests are generally poor predictors of intellectual standing. Bayley, originator of the widely used Bayley Scale of infant development, herself stated that infant tests were inadequate predictors of later development (1955, 1969). Other data (Holden, 1972) suggests

that Bayley scores may be meaningful when used as group measures. That is, infants who, taken as a group, have lower mean Bayley scores than another group may be more likely to have lower IQ measurements on verbal tests in later childhood. In general, however, measurements of intelligence do not start to show much intra-individual stability until after age 4. This stability increases with advancing age, so that by age 7 measures of IQ correlate highly with measures taken at age 17.

Tests of socioemotional functioning usually involve the infant in interaction with the mother figure. Considerable interest has been shown in developing assessments of early eye-to-eye contact between infant and mother as an indicator of at-risk dyadic interaction (e.g., Stern, 1971). Later in the first year of life, home ratings, such as those devised by Ainsworth (e.g., Ainsworth et al., 1978) and laboratory ratings of attachment involving the "strange-situation" or some modification of it (e.g., Greenberg, 1971) are in common use and appear to differentiate between at-risk and well-functioning dyads.

The search for reliable and valid instruments for assessing the status of an infant and of his/her relationship with a parent figure in the first years of life is of utmost importance for clinical-intervention programs. At present, advances have been made in this area, but the situation is far from optimal. Some of the difficulties in infant assessment have to do with the unavailability of appropriate techniques, which remain to be developed as the need arises, but others are inherent in the problem of trying to measure infant functioning. With infants, the tester encounters a wide range of normal intra- and inter-individual variation in the course of normal development. During cognitive testing, the cooperativeness of the infant is an important influence on the resulting DQ (Developmental Quotient) score, and an uncooperative infant may well be underestimated on any one measurement. Infants are unable to communicate verbally with the tester and to relate to him or her more subtle feelings that might allow for better predictions in verbal populations (Meier, 1975).

Obviously there is tremendous need for the development of effective means of screening truly at-risk infants and mothers in a large population defined as being at-risk because of demographic factors. Detailed clinical work, however desirable in cases where real risk is apparent, may be impractical on a larger scale. Levels of screening involving both immediate neurological and/or behavioral assessment of infants and behavioral assessments of mothers' functioning in the hospital may well aid in identification and minimize unnecessary interventions with infants who are on a normal developmental course.

Some issues in evaluation. In order to measure the "success" of a program of prevention or intervention, it is essential to have assessments of developmental progress. However, the collection of such crucial data is hampered by a number of problems. Investigators often use different measures on different populations, and comparability of results is in doubt. Participation in a program by parents is voluntary. Since some individuals refuse and some participate, it is important to determine reasons for refusal in order to ensure that the refusing segment of the population did not differ in significant ways from the participant segment. All too often it is suggested that those involved most in a program for their infants may be those who are least in need, while those at very high risk either have not been reached or are unmotivated to participate. Hence, unless care is taken to achieve representative sampling of a population, it can be difficult to disentangle program effects from effects which might have occurred otherwise, without the intervention.

In programs where infants are referred for a number of disorders varying in type and intensity, it may be difficult to find comparable "no-treatment" controls with whom the intervention group may be compared. There is also a serious ethical question involved in refusing treatment to an infant in need in order to satisfy the demands of an experimental design.

In cases where intervention is begun after a clinically deviant pattern of development has been identified, the infant is often allowed to serve as his or her own control, and developmental progress presumably resulting from intervention is assessed. That is, the clinician observes the initial condition and notes improvement. In programs where intervention is begun before difficulties have appeared and where the intent is to follow up potential high-risk infants, it is difficult to separate out normal developmental changes and variation in behavior of the infant from changes due specifically to the programmatic effort.

There are difficulties involved in trying to assess the relative influences of program components on an infant. For instance, if the program is multifaceted, involving interventions with the parents and the children, at home and in a more structured setting, there is a considerable problem in deciding which element has been most efficacious in stopping further developmental disorders. Such information, while not always essential to a clinician taking a broad approach to a multiproblem family situation, may be of interest to program planners responsible for determining cost-effectiveness.

A final issue to be mentioned involves followup. When is it adequate to demonstrate an effect in order to decide that a program has been a success? During the course of the program? Immediately after its termination? Five years later? In the young adulthood of the infant? Silver (1979) has noted at least one program which showed no short-term effects but did demonstrate long-term effects (Brown, 1977). These and similar issues in assessment of program effectiveness remain only partially resolved.

SUMMARY AND CONCLUSIONS

In the introductory pages of this manuscript, it was suggested that a growing awareness of the parental role in shaping a child through psychological nurture and of a more general societal role in advocacy of child mental health has led to the current strong emphasis on infancy. Through a social evolution, research in infancy and interest in preventive and interventive efforts therein have also grown. Out of these alliances, a holistic field, which brings together knowledge from specific disciplines, has been fashioned. The field is infant mental health and it has dual aims. The first is to foster optimal development and to prevent deviant development during the early years of a child's life. Compelling problems of children, such as abuse, neglect, psychological failure to thrive, sociocultural retardation, and learning disabilities, have received so much public attention that this focus is entirely comprehensible. The second aim of infant mental health, a long-term one, is to chart relationships between early experiences and later mental health or mental illness. Whether early experience is qualitatively different from later experience, and whether adverse effects of the former can be reversed fully by alterations in the environment, are issues still in need of research clarification. In this vein, it seems clear that environmental influences on the individual continue to be exerted at all times in the life span but also that early experience can have significant long-term impact. The first year of life may constitute a "sensitive" period for certain aspects of development, notably those involved in bond formation and social development (Rutter, 1979). For a number of reasons, later approaches to intervention with children, youths, and adults in adverse circumstances may have more limited success than approaches to the very young. Whatever the ultimate resolution of theoretical issues may be, it is perhaps wise to regard infancy as a practically if not psychologically sensitive period in development.

In infancy, the concept of mental health is a broad one with loose boundaries. Infant mental health takes as a point of departure the infant's physical health and competence in dealing with the world of inanimate objects. These latter aspects of early development have been shown to be closely related to mental health more narrowly defined—so much so that the complexity of patterns may tend to overwhelm those who would attempt to intervene on behalf of mental health. Omnibus efforts may be perceived as too massive and global. However, since multiple interrelationships exist, the likelihood is increased that efforts to prevent physical or cognitive disability or to achieve optimal physical or cognitive growth most likely will benefit mental health.

In keeping with the definition set out in the first part of this monograph, a more restricted view of mental health in infancy can be centered on the formation of secure and harmonious relationships with significant others. These others, typically the infant's parents, serve as models of love relationships and, at least until the second year of life, as chief mediators of the physical environment. There is considerable research interest in the basic processes of adaptation of the newborn to the caregiving environment and in attachment formation between infant and caregiver. This segment of the broader picture of mental health in infancy has received sufficient research attention so that preventive and interventive efforts based on present knowledge are likely to return benefits.

The picture of development portrayed throughout this monograph is a thoroughly interactional one, in which the infant is seen as changing the caregiving environment, being changed by it, and changing it in turn again. Infant and caregiver are seen as partners in a dyadic relationship. As partners, they may not exert equal influence at all phases of development. Infant influence may even be strongest in the neonatal period, waning as educability and interest in the environment increase, until some balance is struck between ongoing environmental influences and the strong forces of individuality in the child. The monograph has referred to general and to specific developmental influences residing in infants. These influences and their interactional and transactional effects are as yet incompletely understood. This dearth of knowledge notwithstanding, individuality (whatever genetic and environmental mechanisms shape it) has come to be appreciated in analyses of infant-environment interaction. Likewise individuality is being taken into account more and more in discussions of susceptibility, coping, and prediction. Proscriptions for child care may be naive unless they stress that a key

element in successful psychological caregiving involves flexible adjustment to individual tempo.

Working from general to specific, we have thus far examined the social environment of infants. The issue of basic and perhaps universal environmental requirements is discussed in terms of an evolved adaptive intermeshing with common infant characteristics. Certain environmental features, seen as necessary conditions for healthy development, are generally met by human societies. They are the macropatterns within which considerable variation in micropatterns can be observed and can have a potent influence on development. Hence, variations in maternal styles of caregiving can be seen to influence qualitative aspects of bond formation within a broader social and familial context in which the development of some bond is seen as almost inevitable. Such thoughts draw attention both "back" to "environments of evolutionary adaptedness" (the stuff of ethologists) and forward to contemporary social environments and the influence of rapid and accelerated changes in rearing patterns (the concern of modern social ecologists).

Environmental influences on development, ranging from massive to subtle, are seen as beginning prenatally. Others, based in historical social influences on the personality of caregivers, are viewed as accounting for the persistence of desirable and undesirable patterns of nurture between generations. But evidence of the modifiability of patterns in light of ongoing interaction holds hope for those who would intervene with parents whose childhoods may have otherwise predisposed them to unfavorable relationships with their own infants.

Little can be done to modify heredity or congenital tendencies that may predispose to mental illness or behavioral disorders. But leaving aside the complex issues involved in the etiology of major mental disorders such as schizophrenia, the influence of hereditary factors in deviant development is probably less than that of environmental factors. Other negative predisposing tendencies, such as those stemming from circumstances of prenatal life and the birth process, are more likely to be found in objectively unfavorable environments. Hence, a multiplicity of problems is likely to be found together and is more likely to be chronic. The multiproblem family is more likely to have a multiproblem infant than are other families. Multiplicity and/or chronicity of difficulties may predispose to more long-term damage to the individual than a single stress or handicap.

Efforts to prevent and intervene on behalf of infants at risk would be enriched by access to a longitudinal large-scale base

of prospectively gathered data about general child development. Such a base would provide invaluable information about the epidemiology of various disorders, their frequency, and their correlates (the latter suggesting causation and generating hypotheses to be tested in systematic research). On the other hand, to have some impact, prevention and intervention efforts need not deal with all sources of environmental variance. While clearly desirable, alterations in underlying social structures that perpetuate adverse patterns may be quite difficult to implement. Less massive efforts may also be fruitful. Epidemiological information can help to make efforts both more targeted and more effective.

The utility of research into basic processes of development and into patterns of normal development becomes all the more apparent if one views development on a continuum between normality and abnormality. Such a notion is not a new one, but it serves to relate basic and applied research. To provide only two examples, research dealing with the subtleties of face-to-face interaction between very young infants and their caregivers has been followed by studies of interaction between physically high-risk infants and their caregivers (e.g., Brown and Bakeman, 1978; Field, 1977), in which clues have been provided as to why such infants may be particularly difficult to care for and have a generally less favorable developmental prognosis than other infants. Another application of basic research to a pressing social problem can be noted in George and Main's (1979) linking of gaze and interaction avoidance behavior, observed by Ainsworth and her colleagues in "normal" infants (Ainsworth et al., 1978) to patterns of behavior in toddlers who have been subjected to physical abuse by their parents. Such linkages suggest process dynamics underlying adverse patterns of development and also specific kinds of therapeutic interventions.

Basic research has enhanced understanding of the concept of risk for development. Instead of viewing risk as being permanently and immutably imposed on an infant by a single event, risk is seen as stemming from many sources which may co-occur or which may predispose to further risk.

As normality and abnormality can be viewed as forming a continuum, by analogy the promotion of positive mental health in infancy and the prevention of specific disorders could be similarly conceived. However, it may be that promotion and prevention are different sides of the same coin. For example, efforts to educate prospective parents and to change in-hospital practices involving parents and their newborns may effect benefits in terms of increased parental competence and better pat-

terns of parent-infant interaction and simultaneously lower the incidence of disorders of parent-child interaction that are registered in statistics reflecting the mistreatment of children.

The development of levels of screening for risk in infancy is seen in this monograph as an important goal. Prevention can begin by instituting efforts at the general population level and can proceed where necessary to the most specific kind of one-to-one treatment. Prediction of outcome, based on indices of risk, is still imperfect, but it can probably be greatly improved by refinements leading to cumulative indices of risk and by advances in the understanding of the multiplicative effects of stress.

Rutter (1979a) has summarized five factors implicated in the phenomenon of individual vulnerability versus invulnerability under adverse circumstances. His conclusions, based on longer-range studies into middle and later childhood, have also been reflected in studies of infants and young children reviewed in this monograph. The first factor he describes as implicated in differential outcomes involves the multiplicity of stresses. Stating that there is no good evidence that a single chronic stress carries an appreciable psychiatric risk, he presents evidence that two or more stresses have an effect which is more than their sum. In a related vein, it has been noted in this volume that physically high-risk newborns are more likely to be found in environmentally high-risk homes than are other infants and also that, over the long term, adverse postnatal environments magnify birth risk and favorable ones minimize it (e.g., Birch, 1971; Werner et al., 1971; Sameroff and Chandler, 1975). Furthermore, it may be that the presence of a single stress, biological or social, may actually increase the rate of occurrence of multiple acute stresses (Rutter, 1979a).

A second factor involved in protection and vulnerability may be found in alterations of adverse environments after the early childhood period. For instance, Rutter (1971, 1979b) found that children who had been separated from parents in early childhood because of family strife had a lower incidence of psychiatric disorders if their later family environments were improved than did children who continued later in disruptive family circumstances. Such a finding does not disprove the impact of early experience in shaping later personality, nor does it definitively address the issues of whether children who are subjected to early unfavorable circumstances are not more subtly damaged or more susceptible to new stresses. But it does suggest that later environmental changes, at least of the magnitude involved in the Rutter study, can improve child outcome. It raises again a persistent question about early experience. Is

early experience important because of its primacy or because adverse environments tend to persist throughout childhood. It may be that both primacy and persistence are involved in causation.

A third factor in differential vulnerability is to be found in the child. As has been pointed out in this monograph, there are temperamental, sex, and genetic differences which may either equip children particularly well to cope with adverse experiences or, conversely, may make them particularly susceptible.

A fourth factor discussed by Rutter involves intrafamilial relations. Citing his own research (1971, 1978), he suggests that a good relationship with one figure can serve to protect a child brought up in an otherwise unhappy home. In a similar vein, Main and her associates (Main and Weston, 1979; Main et al., 1979) have in their research found some evidence for the relatively beneficial influence of a good relationship, with either father or mother, on infant social development. This avenue of research should help to correct an overemphasis on the role of the mother in infant development to the exclusion of other figures. It should also impress practitioners with the need to involve both parents in therapeutic efforts on behalf of the child. Likewise it may be that educational and preventive efforts with young men should be pursued as a means not only of promoting father-infant bonding but also of possibly ameliorating negative effects of poor mother-infant relationships. Finally, in this regard, it should be noted that enduring relationships with other family members such as grandparents, or even with nonrelated childcare providers with whom the child has a more or less continuous relationship, may confer some immunity. Hence, further research which takes into account consistency and depth of relationships other than that of mother and child may be informative.

A final factor implicated in differential vulnerability and invulnerability may be found in the wider social environment. Rutter (1977) has gathered evidence to show that children from discordant homes are less likely to develop behavioral problems if they attend good schools than if they attend bad ones. In this monograph, the importance of the "ecology" of mental health has also been stressed. The relative importance of broad ecological versus intrafamilial and even intrarelational factors may shift over the course of development, as certainly must the specific kinds of factors that influence the child. In infancy, broader social factors may be important primarily to the extent that they facilitate or impede one-to-one relationships between the infant and significant others. In middle and later childhood,

ecological variables may become more direct influences on development, as institutions such as schools come to shape the child. That outside influences may have protective value, even when family circumstances are unfavorable, leaves considerable hope that prevention and intervention efforts, even with hard-to-reach and resistant multiproblem families, will have beneficial effects.

In this volume research approaches to the human infant reflect both biological and social-science perspectives. The former attempts to generate a core of knowledge that builds upon past knowledge and is more or less unchanging. The latter yields a substantially more fluid body of knowledge, responsive to changing social concerns. That the social-science component of infant mental health is not immutable is no indictment of its research efforts but more accurately a reflection of the need to reevaluate conclusions as rearing patterns and even population compositions are altered. The biological perspective, always the more conservative, serves to identify universals and even to suggest limits to change. The social-science perspective reflects cultural values and offers a challenge to conservative perspectives. Their fusion, the sociobiological perspective, promises the richest understanding of human infancy.

While scientists, aware as they are of the tentative nature of research conclusions, are sometimes reluctant to translate them into direct practical applications, advocacy must have a firm base in knowledge. Research applications are to be had and findings can be utilized in an experimental approach to mental health in infancy.

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